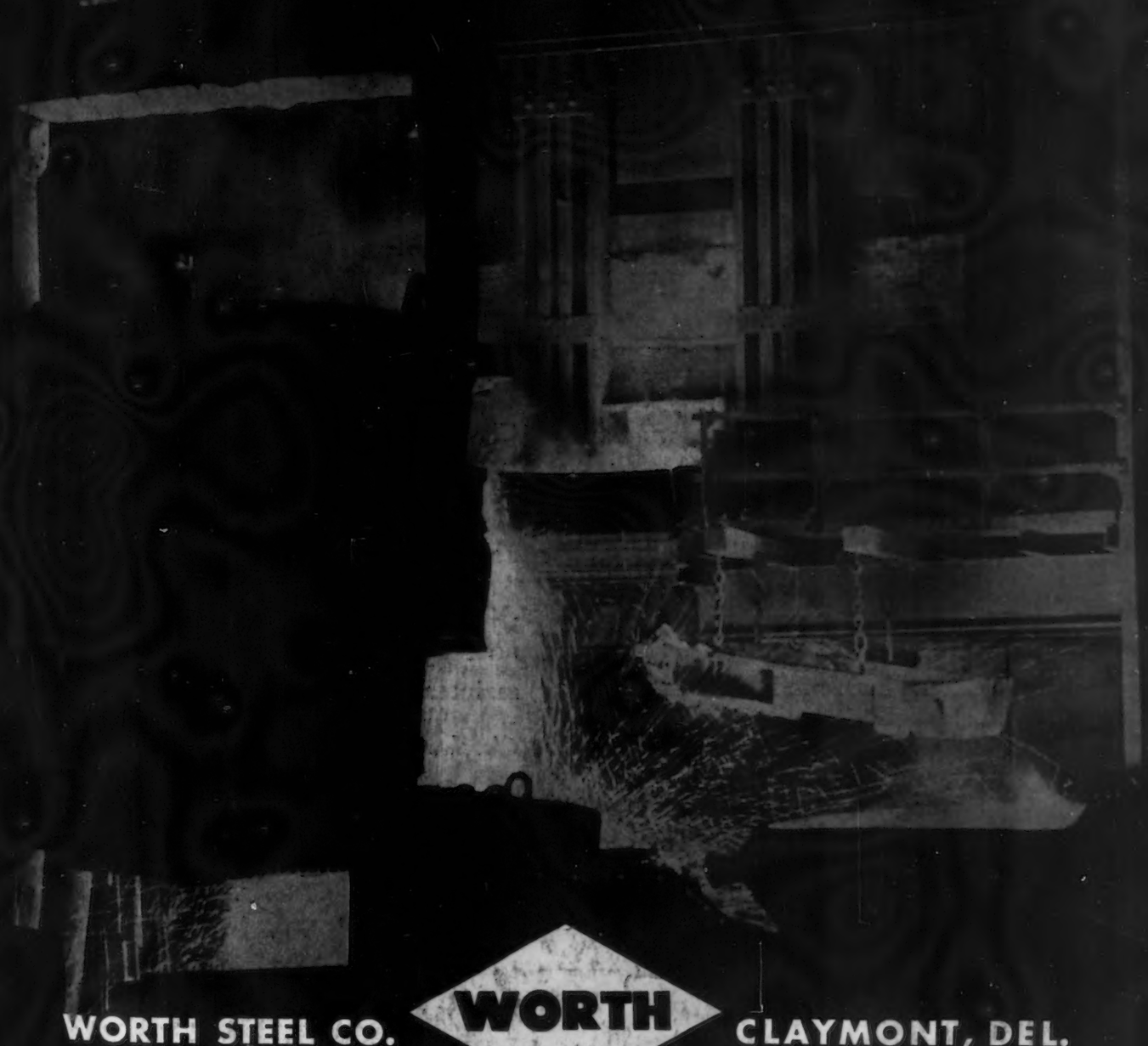
ANUARY 15, 1942

The IRON AGE



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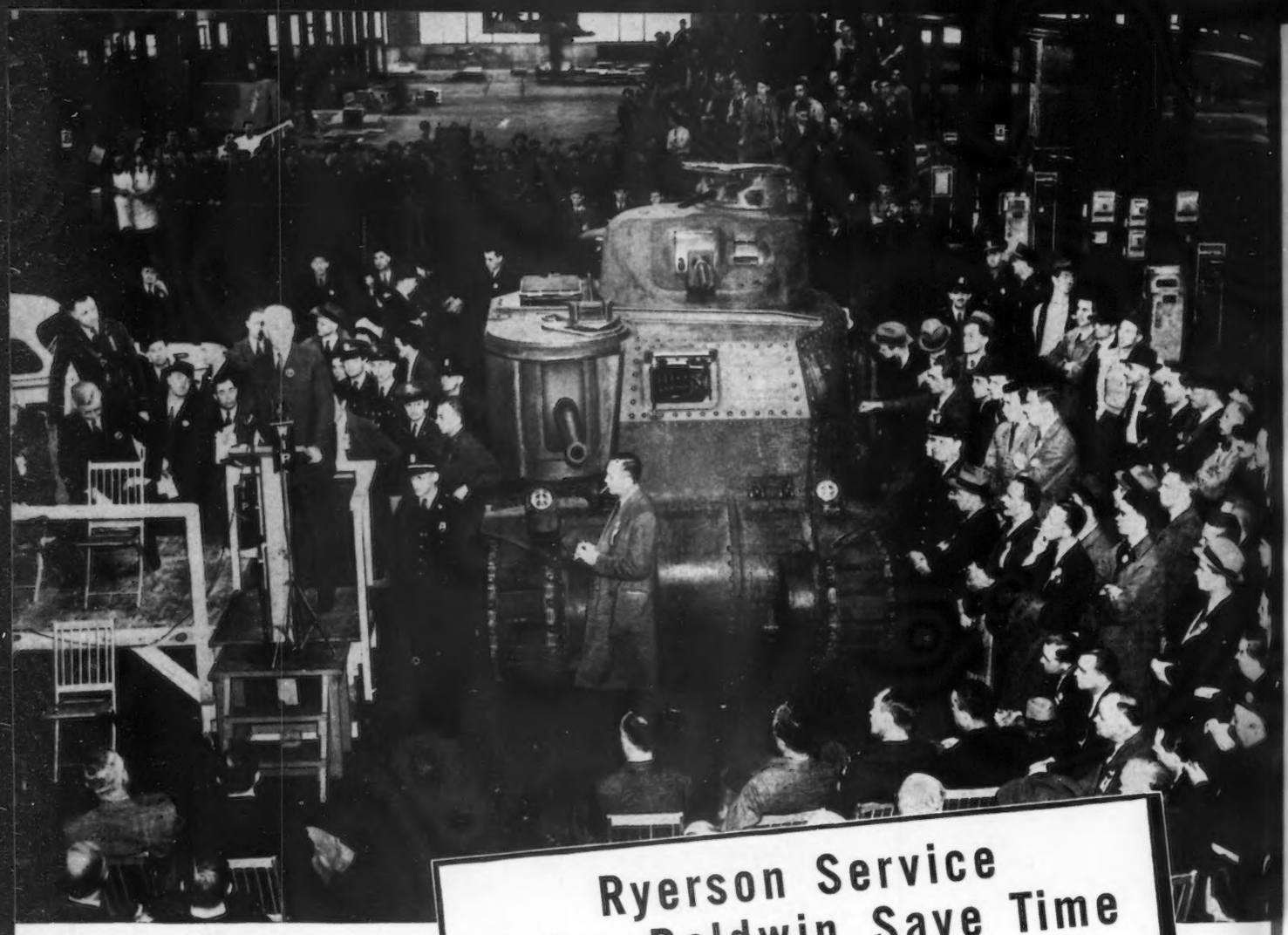
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Mr Charles Brinley, President of the Baldwin Locomotive Works speaking at ceremonies when Baldwin's first M-3 tank was turned over to the Army.

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THE IRON AGE

JANUARY 15, 1942

ESTABLISHED 1855

Chromium Trimmings Are Out

CHROMIUM trimmings on pleasure cars are "out" for the duration, and so apparently are the cars themselves. The powers that be have decided that in our all-out war effort, we must dispense, not only with our luxuries, but also with some of the things that we have grown accustomed to thinking of as necessities.

All good Americans will go along with Uncle Sam on that basis. There will be no howl from John Public if he has to substitute shoe leather for auto tires, just as there has been no kick from him about the tidal wave of taxes that will sweep over him beginning March 15, 1942.

But if John Public is asked to dispense with what he has come to consider essentials, he has the right and the duty to ask that Uncle Sam take the chromium plate off government. That Uncle Sam, in other words, meet the taxpayer half way by doing away with the non-essential expenditures that have accumulated on the ship of state just as barnacles accumulate on the hull of a seagoing vessel.

It has been nice, for example, to have had our CCC boys take such good care of clearing brush from the national parks, thereby making these places more attractive to a motoring public. But now that motoring vacations are "out the window," we might suggest that a more suitable place for these lads, who are apparently healthy and hearty and not heads of families, would be in our Army or Navy.

It has been nice to know that you did not have to provide for your parents or your grandparents when work was hard to get and that government relief would take care of them. But now that you have steady work and 14 hours a week overtime at time and a half, perhaps you might relieve Uncle Sam and incidentally John Public of some of that burden.

It has been nice to know that if you could not get a job in private industry, the WPA would provide work for you. But with the demand for able bodied men now exceeding the supply, perhaps the time has come to think about taxpayer relief as well as public work relief.

It has been nice to have been able to turn on the radio and hear the Department of Agriculture broadcast musical programs and tell you how to make sponge cake or pickle pears. But perhaps this too is some of the chrome plating of a peacetime economy—or lack of it.

Senator Harry F. Byrd says that government ought to cut out $1.3 billions of this sort of chrome trimming during 1942 and has shown how it can be done. I think we ought to second the motion to our congressmen.

J. W. Vandervort



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Trouble Shooting In Tool Hardening

By ROBERT C. STEWART
Metallurgist, Apco Petroleum Products Ltd, Toronto, Canada

...The causes and cures of many tool failures, prescribed manufacturing, heat treating, and handling practices, and the results of improper preparations and use of tools are discussed herein.

THE expression "trouble shooting," encompasses the whole problem of trying to determine why a tool or fixture failed prematurely, either during manufacture or in service. Naturally, some types of failure are self-evident insofar as the user is concerned. For example, if a cutting tool fails while being used, the operator readily arrives at the conclusion that the tool is too soft and returns it to the manufacturer for replacement. The manufacturer, however, has a more baffling problem, because he must find out why the tool is too soft and remedy this condition. Thus, "trouble shooting" has a definite task: The intelligent examination of the failing part, and, as a result of the examination, the modification of the replacement part and its treatment so as to eliminate any further premature failures.

Tools generally are scrapped for one of several reasons. They are too soft, too hard, cracked, or they are warped or moved too much as a result of heat treatment. In order to determine just what was wrong with a given tool, and why, requires a systematic investigation beginning with the examination of the broken parts. It is the intention of this discussion to outline such a system that can be adopted by a plant confronted with problems of this nature. It should be borne in mind that no preliminary treatment such as annealing or softening of tools should be attempted until it is certain that all that can be learned about the parts, and their previous history has been recorded.

As previously mentioned, there are definite causes for tool failure. Lack of sufficient hardness in a tool may be caused by a steel which was too soft originally or it may be the result of softening in service. If the steel was too soft, increasing the surface hardness by heat treatment will usually suffice. Softening in service can be overcome by use of a steel possessing greater red hardness, that is, one that is capable of retaining its hardness at a higher temperature, as in the case of a high speed steel, or the trouble may be eliminated in some cases by the application of a coolant or by reducing the cutting speed.

Excessive hardness of tools is self-evident, and is recognized by crumbling or spalling of the cutting edges or by complete tool fracture. Spalling due to excessive hardness must not be confused, however, with that due to too much front rake or fracture from overloading a dull tool. Excessive hardness can usually be remedied by tempering the tool at a higher temperature.

When failure is not due to these causes, it is generally the result



FIG. 1—This cutter was fractured for examination, revealing carbon and scale in outlined crack through which the fracture was made. Cracking of this tool occurred during heat treatment and could have been avoided by permitting it to cool in still air instead of in an oil bath after quenching from 1000 deg. F.

of warping or cracking during heat treatment and in such cases the following systematic scheme should be observed.

All that is possible should be learned about the previous history of the tool. If it is known that it has not already been rehardened a second time and that it was not machined in such a manner as to be in a badly strained condition, it should be carefully Rockwelled a number of times. One group of hardness tests should be confined to the edges and corners of the piece and another group to the area in the center of the large flat faces. If the piece is in a strained condition, resulting from machining, a stress relieving anneal, before hardening, should be carried out at 1200 deg. F.

If the Rockwell hardness is uniformly higher around the edges than in the center of the flat surfaces, the trouble may be due to one of three things:

(1) **Wrong quenching medium:** A water hardening carbon tool steel when oil quenched may be quite hard when tested at the corners and edges by either a file test or a Rockwell test, but it will test soft in the center of the flat surfaces, possibly dropping down to about 40 Rockwell C. Generally, a change to a faster quenching medium is all that is required, and quenching into water or brine will eliminate the trouble. In isolated cases where it is desirable to oil quench owing to a complicated section, greater hardenability can be induced by raising the quenching temperature to about 1600 deg. F. maximum, and quenching in oil as before. By oil quenching from 1600 deg. F., hardness as high as 64 Rockwell C may be obtained at the surface of a ¾-in. section of 1.10 per cent carbon steel, the depth of penetration, of course, varying with the mass of the piece and the carbon content, being deepest for a 0.90 per cent carbon steel.

(2) **Underheating:** The steel may have been underheated or not soaked long enough to allow it to be heated throughout. Usually with a defect of this nature, the whole of the hardened areas will break cleanly away from the softer areas underneath. In such instances the core hardness will be considerably lower than 40 Rockwell C, possibly as low as 20 to 30 Rockwell C, that is, the annealed hardness for the steel in question, proving that parts of the tool had never been heated through the critical temperature.

(3) **Overheating:** If the Rockwell hardness, as examined, is lower around the edges than in the center, most common in the manganese oil-hardening steels and in the high carbon, high chromium series, the steel has likely been overheated. On subsequent fracturing the grain size, as viewed on the fractured surface, will appear coarser than normal for the type, particularly near the outside of the piece. In this condition the pieces are usually only partially magnetic and in some cases will not cling to a magnetic chuck.

If soft areas are general over the entire surface after surface grinding, it may be due to grinding skin, local overheating resulting from grinding with the wrong type of wheel, or careless or too rapid grinding. If this condition is suspected, an area that has not been ground since hardening should be carefully tested. If grinding is the cause, hardness on the unground areas will be satisfactory and usually, in such cases, careful regrinding to remove the soft skin will restore the original hardness.

If the Rockwell examination fails to give a clue, dimensions of the piece should be checked and if overall expansion or contraction is excessive for the type of steel being examined, an effort should be made to determine if overheating or underheating is the cause of premature failure of the tool.

From an examination of dilation curves, it is obvious that for the deep hardening, slow transformation steels, shrinkage is an indication of overheating with consequent retention of austenite. It should be noted that tempering in the range of austenite decomposition in these steels will produce a marked expansion.

If the piece is badly off size in only one dimension, suspicion should be upon the tool maker or the method of heating should be checked to determine if the piece was adequately supported while heating for hardening in order to avoid sagging or warping in the furnace. It may be stated that any size change in a piece of steel

as the result of transformation due to hardening is strictly a volume or density change, and, disregarding the effect of any hot upsetting, will be proportional to the geometry of the piece and will be evident in all directions. By hot upsetting is meant that special instance of warping because portions of the tool that cool first drag the still hot portions with them as they contract and then when the last hot portions finally cool and contract, the stresses so created may often warp or twist the tool and occasionally even break it.

Fracture Examinations

If the tool being examined shows a crack anywhere on its surface, it may be fractured through the crack and the exposed surfaces examined visually. The exposed surface may be similar to that in Fig. 1, with a large area of the break being of normal appearance but with patches around the edges or the crack of quite a different luster or color. At these areas temper colors or oil films may be found, and, depending upon how the piece was heated, lead oxide or salt films may be present.

Fig. 1 will also illustrate what information can be gained by such examination of a broken high speed cutter. When freshly broken, the large portion of the surface was of normal appearance with no evidence of fish scale or other deleterious structures. Complete freedom from woody structure was also an indication that the bar from which the cutter was made was commercially sound and satisfactory. This was later confirmed by microscopic examination. The small darker areas that occur immediately below the cracks that were visible at the surface before the cutter was broken were covered with a thin, black, dense, tightly adhering scale. A record of the heat treatment of the cutter was as follows: (1) Preheated to 1600 deg. F. and transferred to a high temperature of 2340 deg. F.; (2) the quench was interrupted by quenching into molten lead at 1000 deg. F. and the cutter was then removed from the lead and finish quenched in oil, and (3) afer cooling, it was double drawn at 1050 deg. F. in a circulating type of air draw furnace.

To establish at what part of the treating cycle the break occurred, a process of elimination was resorted to. If the crack was the result of reheating a piece that had already been hardened and not afterward fully annealed, the cracked surfaces would contain heavy scale, and lead oxide from the lead quench would filter into the cracks. Also, the freshly fractured areas would possess a fish scale or spangly fracture. In the cutter shown in Fig. 1, neither of these items was the cause of breakage. If cracking occurred during the lead arrest, lead oxide would be present in the crack after tempering. This was not the case in the example.

Cooling from the lead arrest, in this case in an oil bath, any crack that might occur would contain oil. Later in tempering at 1050 deg. F., this oil would crack and leave a deposit of carbon in the fissure that would either be straw-colored or blue, due to tempering colors formed by the oxidizing action of air that might permeate into the crack while at 1050 deg. F. This scale may even appear as a tightly adherent gun metal film, its color and thickness depending upon the ease with which the oil had access to the fractured surfaces during tempering. This was actually the condition observed in the sample shown, and of course it was an error to cool the steel in oil following the interrupted lead quench since the steel was already below its critical temperature and would finally harden regardless of the rate of further cooling. After interrupted quenching at 1000 deg. F., high speed steel should be allowed to cool in still air. Any faster cooling merely creates stresses of varying magnitude, which, in the case under discussion, caused cracking.



FIG. 2—A typical defect, rectilinear lines, as revealed by deep etching.

If cracking occurs during tempering, the cracks will contain temper colors as stated, but lead oxide or oil carbon will be absent. In every instance of cracking during tempering the colors exhibited by the original fracture will be straw colored or light blue, and this may be questioned since in carbon steel a temperature of 450 deg. F., or thereabout, will give similar colors. This is actually the temperature at which the cracking occurs during the cooling from 1050 deg. F., as the retained austenite only decomposes during the cooling and in the vicinity of 450 deg. F. The color is naturally that which is developed at this temperature after cracking has taken place and has exposed fresh, clean surfaces.

The fresh surface may contain light, lustrous areas, much lighter in color than the surrounding fracture surface, and in these areas the grain size is usually coarser. Fortunately this condition is rather rare in tool steels, but is due to the existence of light areas, called flakes, in the bar usually at the time of manufacture. These flakes are the result of "clinking" or internal cracking caused by overstressing the center portion of the ingot or billet while heating or hot working. Failures from this cause are the fault of the steel maker and can often be detected by deep etching disks removed from the billet or bar.

Notched Tool Failures

Notched failures are usually apparent from the surface of the bar and are easily recognized even from the surface whenever cracks are seen to start from sharp corners or abrupt section changes. On

breaking, this failure appears typically like a fatigue failure, stress concentration at the notch or sharp section change causing local overstressing and subsequent local cracking. Stress concentration is now transferred to the notch at the bottom of the crack, which is again overstressed, and ruptures. Thus, the crack is propagated progressively across the cross-section until the original area is so reduced that it cannot carry the load and will break when the piece is in service. If cracked during hardening, there may be only rather deep cracks running into the interior of the piece, starting at the section changes. The fractured surface is generally observed to have fan shaped markings, suggesting a progressive break advancing across the surface like the spread of an ink blot on blotting paper.

Fracturing a cracked tool may also reveal obvious mill defects such as pipes, seams, woody fractures, etc., which are not in any way the fault of the heat treater or of defective design, but revert right back to the maker of the steel.

Coarse grained fractures, accompanied by complete shattering of the tool, are indicative of overheating and in such instances hardness may be normal for the type of steel.

Spalled fractures, usually at the corners and edges of the tool, frequently possess fine grain at the original fractured surface, and are in most cases the result of underheating or of the removing from the quench too soon and immediately tempering. Underheating can be recognized by the fact that the spalled pieces will be fully hard while the areas from which the spalled pieces broke will be soft. When a tool is removed from the quench too quickly, a typical duplex fracture is frequently visible, with areas that appear fine grained and adjacent areas that appear coarse grained. Removal of a suitable test piece and quenching and fracturing for the Shephard "P-F" test will show the steel to be normal in such cases, and full heating followed by full quenching will result in satisfactory tools. In this connection it is better to quench a piece fully in brine than to try to snatch it from the brine at some intermediate temperature and finish the quench in oil, because it is utterly impossible to determine accurately the temperature of the core at the time of transfer. If all parts of the piece are not at some temperature in the vicinity of 450 deg. F., more damage than good will result because of the setting up of excessive strains that very often cause the tool or piece to crack right in the oil quenching tank.

One-half of the broken tool can now be annealed and then both halves hot etched in 1:1 hydrochloric acid at 180 deg. F. for a short time and examined visually. If both halves have a profusion of "crazy cracks," like a cobweb or the checking noticed in the surface glaze of old china, grinding cracks may be the source of the failures by providing suitable notches from which fatigue failures can start. Often when this is observed it will be coincident with low hardness at the ground surface and this should have been noticed when hardness tests were made, as previously suggested. In any case, such failures may be due to abusive grinding, such as too heavy a feed, wrong wheel, etc. Improper tempering or even lack of tempering may be the cause of the trouble. In these cases, enough strains are already present in the piece so that rapid local expansions, because of the heat of grinding, may exceed the tensile strength of the material — thus, cracking will occur.

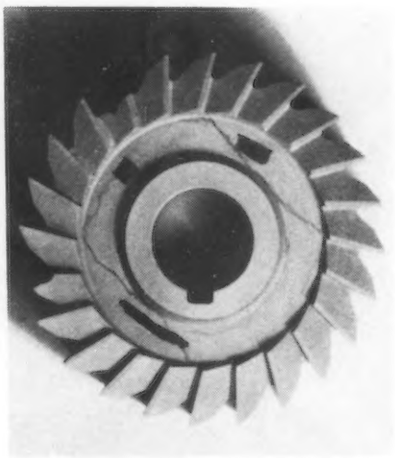


FIG. 3—Here is the result of the hot etch defect shown in Fig. 2 when such steel is made into a tool.

Soft areas on the surface may cause cracking in grinding and may be the result of the blanketing effect of tongs upon the work or the blanketing effect of adjacent portions of the piece preventing free flow of quenching medium over the surface. These soft spots often give trouble in grinding. When a piece of carbon steel hardens fully, it expands considerably. While a soft spot does not expand, it will be stretched like a drumhead by the surrounding expanding material. This drumhead-like area now in tension may be easily stressed over its tensile strength due to the heating effect of the grinding, causing more expansion and thus increasing the tension. When this type of failure occurs the soft area is usually surrounded by a crack and hot etching will show up these soft spot areas, as they etch lighter than surrounding areas. They can sometimes be eliminated by changing from water to brine for quenching. A typical defect as revealed by deep etching is shown in Fig. 2, where rectilinear lines can be observed. Fig. 3 shows the result when cutters made from this type of steel were hardened.

Defects Revealed by Etching

Following are mill defects that can be revealed by the hot etch, and may be the source of failures. These defects were taken from the Metals Handbook of the American Society for Metals.

Seams: Seams in rolled material are of varying depth and usually extend in a straight line parallel to the direction of rolling. With forged material, seams follow the contour of the forging and the flow of the metal. The most detrimental effect of the presence of seams is their tendency to start fatigue failures or to open up into deep hardening cracks during heat treatment. This type of failure can be avoided if, in fabricating the part, the surface is machined to sufficient depth to remove the seams.

Surface Cracks: As revealed by deep etching, surface cracks usually follow irregular lines and may result from improper handling during heating, forging or rolling, or during cooling from the finishing temperature. In hardened pieces, such cracks are frequently due to grinding. Cracks may be caused by the effect of the hot acid on the hardened surface and at least one-half of the piece should be annealed prior to hot etching. If both the annealed and the hard piece show

such cracks, they are then due to grinding. However, if cracks are visible only on the hard piece, they are caused by the acid and their presence may be neglected.

Internal Cracks and Flakes: These can be detected by hot etching and their identity can be verified by a fracture test of a hardened specimen, where they are revealed as bright crystalline spots. The occurrence of internal cracks is detrimental to the steel and there are no means of overcoming their ill effect except by further hot reduction.

Pipes: Pipes are internal cavities and are invariably associated with segregated impurities that are deeply attacked by the etching agent. Cavities in the center not associated with deeply attacked impurities are often mistaken for pipe, whereas such cavities can usually be traced to bursts caused by improper handling of the steel during forging or rolling.

Segregations: These defects are revealed by the severity of the acid attack on the affected areas. The segregations may occur at the center and be deeply attacked so that after etching they may appear as a pipe, or the segregation may be grouped in a rectangular form about the axis of the bar. Nonmetallic inclusions also leave their mark by the presence of pits after macro-etching. Segregation as revealed by macro-etching is not always an indication of defective material.

Dendritic Patterns: Dendritic patterns are often revealed by deep etching but it has never been proved that they are in any way associated with service failures.

In the examination of carbon steel fractures and failures, the terms coarse and fine grained, as applied to the appearance of the core structure, are often used. This is so probably because in most sample sections the examined portion of the total cross-section is much larger than that which has actually transformed to fully hardened products, and this, at least to the novice, is the portion that catches the eye. Actually, grain size evaluations on carbon steels should be based on the apparent size of the grains in the rim portion, as revealed on a freshly broken specimen, and on the thickness of this rim, that is, the depth of penetration of hardness.

The Shephard "P-F" test utilizes this method of examination and is carried out by making the comparison between the freshly broken fracture of a standard sized test piece after suitable quenching from 1550 deg. F., and a set of martensitic fracture grain standards. From this comparison, a grain size number is arrived at, after which the depth of penetration is measured in thirty-secondths of an inch. This number is an index of the hardenability of the steel being examined and an indication of whether it will be coarse or fine grained when quenched from 1550 deg. F.

In case of doubt as to the cause of failure of a carbon steel tool, much can be learned quickly if a standard ¾-in. "P-F" test specimen is machined from the annealed tool, and, after a standard quench from 1550 deg. F., is classified against a standard fracture test set. Usually from this procedure much valuable information can be gained quickly as to whether the steel or its treatment is at fault.

For example, a large cross-head reamer was submitted for examination with the remark that it was a case of bad steel and that it had cracked in the quench. Examination of the broken pieces showed practically no refined rim and the core had an extremely coarse fracture surface. The hardness was low except for the flutes and the corners of the fluted portion. The reamer part was annealed, and a "P-F" test piece was machined from this section. This piece was then given the standard "P-F" Shephard treatment and fractured, whereupon it showed a beautiful fine rim structure of satisfactory depth, indicating that the hardness characteristics were good. Chemical analysis, microstructure, etc., were all found to be satisfactory so a case history of the original heat treatment was sought.

It was learned that the original treatment consisted of heating to 1470 deg. F., quenching in brine until the tongs were no longer felt to vibrate in the hands of the operator, and then finishing the quench by transferring the reamer to an oil tank to cool more slowly. This type of interrupted quench, which may be worked out as a satisfactory cycle for certain small production parts by trial and adjustment, becomes a guess when applied to a single piece of large section and it is much safer to finish the quench in the brine. Unless it is certain that the temperature of the whole piece is within the narrow range of 400 to 600 deg. F., when transferred to the oil,

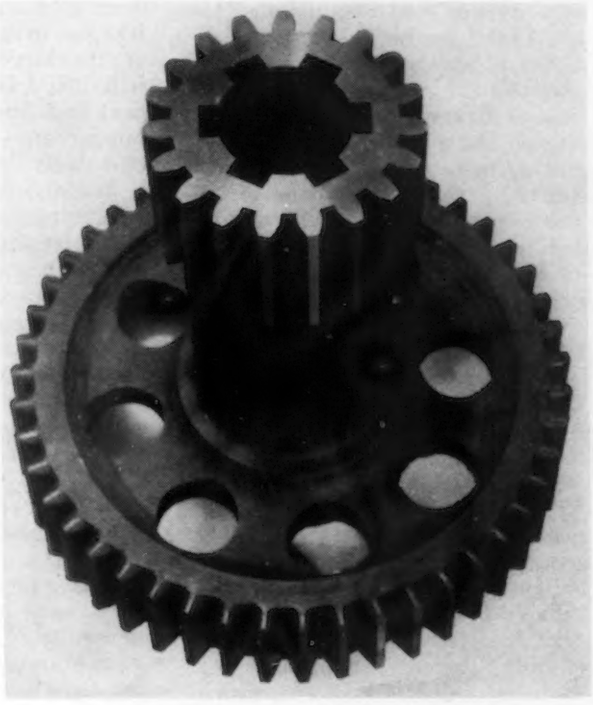


FIG. 4—Originally made with a solid web in the large gear, it was found that a more uniform rate of heat treatment with less warping and distortion could be obtained in this gear cluster by reducing the web thickness to ¾ in. and drilling holes through it.

more damage will result from an interrupted quench than if the piece were quenched cold in the brine. In any event, the replacement reamer, when quenched right out in brine, developed a satisfactory hardness and did not break.

Soft Spots in Tools

If earlier Rockwell examinations of the surface of the defective tools showed soft spots, several things must be kept in mind when drawing conclusions from such observations. Usually, at least two soft areas can be found on any section at those locations that were adjacent to the tongs, and here some consideration to the actual hardness on these soft areas may be enlightening. If soft spots test about 55 to 58 Rockwell C, the steel has at least been quenched to form martensite, subsequently tempered somewhat, and some other source of trouble, rather than tongs, must be sought. Spots under tongs never actually cool fast enough to form martensite and consequently are about 40 to 45 Rockwell C. If the location of these spots is objectional, the trouble can be remedied by arranging to hold the work during the quench in some other manner.

If soft spots are numerous and appear under the surface scale, adjustment of the furnace atmosphere will eliminate the trouble. It might be pointed out that such scale, if tightly adherent, may be due to nearly neutral furnace atmosphere, and the best way to insure complete freedom from soft spots resulting from the wrong atmosphere is to employ one containing from 6 to 10 per cent excess oxygen. Reducing atmospheres are extremely decarburizing to most tool steels and are to be avoided entirely except for high carbon, high chromium steels and for high speed steels. Steels heated in reducing atmospheres will come from the quench dark in color and will be soft all over the surface, while steel quenched from a furnace with a 10 per cent oxygen atmosphere will be free from scale when quenched, light gray in color, and file hard. During actual heating, the 10 per cent oxygen atmosphere will form a thin, tightly adherent scale that will effectively seal the surface from further scaling or decarburization. This scale will be readily "thrown" during brine quenching.

Much cracking and warping during heat treatment can be avoided by careful consideration during design and manufacture to avoid sudden changes in section and also to employ shapes that will tend to keep temperature gradients at a minimum during heating and cooling. It must further be pointed out that even though the use of the oil or the air-hardening nondeforming steels greatly minimizes the danger of breakage from sudden changes in section, still a tool with sharp corners and abrupt changes in section can not well distribute the stresses imposed in service, and such design is to be avoided when possible. From a design standpoint, the ideal would be to produce tools so uniform in cross-section that the whole piece will heat and cool at a uniform rate during heat treatment. This ideal is of course seldom attained but it is to this end that balanced sections are employed and heavy masses lightened by drilling holes so that the mass of the lighter section is more closely approximated. Anything that can be done to improve this condition will greatly aid in reducing movement caused by the formation of martensite in quenching.

This type of treatment is shown in Fig. 4. The gear cluster was originally made with a solid web in the large gear and was of the same width as the teeth. The steel was SAE 6150 and when quenched and tempered, the splined bore was 0.016 in. bell-mouthed at the big gear end. The web thickness was reduced to $\frac{3}{4}$ in. and holes were drilled so that the gear appeared as shown. After treating in this condition, the splined hole was slightly barrel shaped, being 0.0015 in. small at each end, which is negligible for a gear of this nature. It is interesting to note that, when sections were rendered nearly alike, the hot upsetting induced by the teeth at each end of the cluster during cooling was enough to render the bore slightly barrel shaped.

Heat Treating Defects

Warping usually occurs during the heating period, is very common on thin, flat sections and is generally traced to the tendency to lay the pieces flat on the hearth of the furnace. This practice is entirely wrong, as the side in contact with the hearth heats at an entirely different rate from those surfaces exposed only to radiant heat or to a flow of hot gases. It is far better to tilt such pieces by leaning them against some support, such as a thin flat brick. This will permit free passage of hot gases over all surfaces, and only an edge contact will be maintained with the hearth. In the heating of small saws, disks, etc., it may be found helpful to suspend them from suitable hooks placed in the furnace.

Longitudinal cracking, or longitudinal seams, occur in small diameter tools, usually in sizes from $\frac{1}{4}$ to $\frac{3}{8}$ in. in plain carbon steels and slightly larger in carbon-chromium steels. In all of the shallow hardening steels, that is, the water-hardening carbon steels, there is one critical size that gives much trouble because of seaming during heat treatment. This critical size may be defined as the size of the largest cross-section that will just harden through 100 per cent and fine grain size does not appear to eliminate the trouble effectively. It is noteworthy that it is only present in the water-hardening steels, the other types being immune regardless of size. Although steels like the manganese oil-hardening steels harden right through any section, owing to their tendency to retain austenite, they do not expand nearly as much as carbon steel during heat treatment. Expansion, as quenched, is less than 0.001 in. per linear inch, and as low as 0.0004 in. per linear inch when tempered at 400 deg. F. In addition to this, the slower quench minimized hot upsetting effects. Carbon steel, when hardened through, expands approximately 0.0033 in. per linear in. at extremely high speeds. Fig. 5 will show how bursting may occur. During this wavelike transformation, bursting stresses that exceed the instantaneous tensile strength of the rim, are set up in the center of the piece and seaming occurs. To eliminate or control this condition, it is necessary to cool at such a rate that a slight core exists and this is best done by quenching from 1600 deg. F. in oil.

In sizes below this critical size, transformation, instead of being a wavelike propagation from the surface inward, is instantaneous, and a uniform, overall expansion occurs with lower stresses involved. This immunity to cracking in sizes smaller than the critical size is also attributed to the retention of a small quantity of

austenite. In sizes above the critical size, a ductile core, that will tend to remain fixed, is retained at the center of the piece, but because of the expansion of the fully hard case will be stretched elastically, and thus absorb the stress without rupture as long as the tensile strength of the core material is not exceeded. Oddly enough, small taps that harden completely through must have their lead cut short to allow for the expansion that will take place, which, in effect, causes the thread helix to unwind and thus lengthen the lead.

It is quite common practice to make parts from cold rolled steel and later subject them to some form of heat treatment, only to find excessive movement and warping have taken place. Cold rolled steel is work hardened to improve its physical properties, and, consequently, it is in a strained condition when received from the mill. Any machining will serve to remove or relieve some of this strain locally, and a condition of unbalanced strain will be created. Upon heating for hardening these unsymmetrical strains will warp the piece prior to their elimination due to temperature rise. Any warping that occurs at this time is not removed during the remainder of the heat treating cycle. Such items as counter-sunk holes are notorious for causing this type of unsymmetrical warping. Another extremely difficult thing to do, because of this cold working, is to cut an accurate thread on a cold rolled bar because the gashing out of the thread releases some of the strains and those remaining produce all sorts of trouble. To avoid trouble from strains in cold rolled material, it should be heat treated at 1200 deg. F. to give a stress relieving anneal before attempting any machining. The machinability will be impaired somewhat but the finished piece will be closer to desired dimensions. In some types of steel, machining will produce internal strains of some magnitude, and a stress relieving anneal is advised prior to the finish machining. This is particularly true in the case of manganese oil hardening steels.

Suspiciously like seams, cracking sometimes occurs in high speed tools, and is all too prevalent in the cobalt steels. If such cracked tools are examined microscopically after sectioning at right-angles to the crack, there will be found, completely surrounding the surface of the piece, columnar crystals of ferrite, forming a band of completely decarburized material. The cracks will be found to originate at the base of these characteristic columnar crystals. Thorough removal of all decarburized skin prior to heat treatment will eliminate this trouble. Nearly all cracking during heat treatment of high speed steels can be traced to incomplete removal of the skin from the original stock. For the same reason, high speed steels should be treated in an atmosphere high in carbon monoxide, especially the cobalt high speed steels, since the thin, decarburized rim that is often formed during heat treatment is sufficient to cause the cracks.

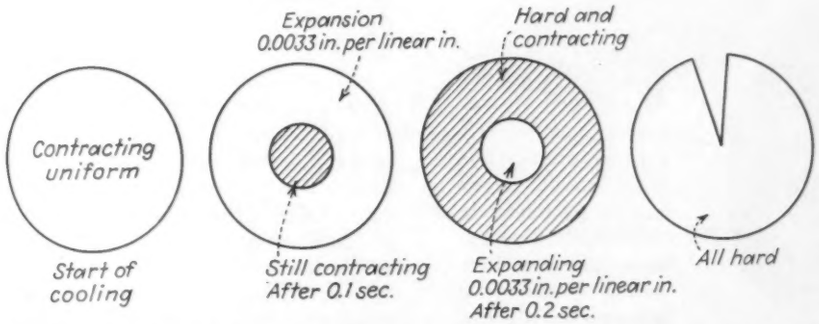


FIG. 5—Bursting stresses are set up in the center of the bar and exceed the instantaneous tensile strength of the rim, causing seaming, in carbon steels. The action is progressively shown here. This condition might be eliminated by cooling at such a rate that only a very slight core exists.

In the SAE heat treating steel series, if the usual precautions are taken to avoid water quenching the oil hardening types, little trouble will be encountered. In the oil hardening types, however, it is well to remember that they are deep hardening, and both overheating and abrupt changes in section should be avoided. Also, every effort should be made in designing pieces to keep the mass of the various sections as uniform as possible, sometimes resorting to the use of two or three pieces in an assembly rather than producing the tool as a unit.

Heat Treating Steels

Carbon tool steels are subject to considerable movement in hardening. Small sections, up to about ¼ in., harden completely through and an overall expansion will take place, while large sections, 1 in. and over, generally contract because the movement resulting from volume increase in hardening is confined to the case. Thus, proportionally greater expansion because of structural change is more likely to occur in a small tool than in a large one. Steels that do not show a tendency to grain growth on overheating are likely to be shallow hardening and show a tendency to soft spots, even when drastically cooled during quenching. Such steels generally have a higher oxide content than more normal steels. Steels that show a tendency to coarsening on overheating are likely to be deep hardening and free from soft spots, but are usually somewhat more brittle. The addition of 0.3 to 0.4 per cent chromium will usually convert the coarse grained steels into deep hardening, fine grained material, possessing satisfactory toughness, and, paradoxically enough, a 1.10 per cent carbon, 0.40 per cent chromium steel, while superior to a plain carbon steel for many jobs, including those that demand increased resistance to abrasion, is several cents a pound cheaper than a good carbon steel.

If decarburization trouble is encountered in furnace hardening, the atmosphere condition should be adjusted, and from 6 to 10 per cent free oxygen maintained to insure freedom from soft spots. Tempering by color is unsatisfactory and a tool should be tempered

either in an air drawn furnace or in salt or oil bath, to insure freedom from grinding cracks and unexpected breakages. As a rule, tools should not be quenched after drawing. This is a practice carried out all too frequently, as an aid to cleaning off the remains of the draw salt or oil, but it is very hard on the tools.

Manganese oil-hardening steels are deep hardening, and cracking may occur if abrupt section changes or sharp angles are present. This type is not likely to move much in hardening because of its low volume change, owing to the retention of considerable austenite upon quenching. Although insufficient to show appreciable secondary hardness on tempering in the region of austenite decomposition, tempering in the range of 450 to 600 deg. F. is the source of considerable trouble, with undue brittleness, and consequently, tempering in this range should be avoided. To avoid soft skin in hardening, a furnace atmosphere containing 10 per cent oxygen should be maintained.

High carbon, high chromium steels are not likely to give any trouble from movement or breakage if the original material is sound. These steels are notorious for their tendency to decarburize and harden with a soft skin, and must be heated in a protective atmosphere with at least 20 per cent carbon monoxide, or in a Vapocarb or Hayes atmosphere. If no such equipment is available, parts should be heated in a charcoal pack. By any of these methods, satisfactory surface hardness should result. If overheated, the parts will show low Rockwell hardness, will shrink appreciably, and will be slightly non-magnetic. For extreme abrasion resistance, this type may be quenched from 2000 to 2100 deg. F. in oil, tempered at 1050 to 1100 deg. F., and then nitrided after finish grinding.

Hot die steels at present are used extensively for hot piercing shell blanks. Owing to their analysis, these steels carburize very easily, and inasmuch as they depend upon their low carbon content for their properties, should not be heated in a pack or in a high reducing atmosphere, but preferably in one containing about 2 per cent excess oxygen. In service, they invariably fail by fire checking. It is believed by some authorities that this type of failure is somewhat akin to fatigue failure and that it can be avoided by periodic annealing and rehardening at intervals slightly shorter than necessary to initiate fire checking. In other words, these periodic rehardening treatments may provide a means of "washing the slate clean of any previous strains, stresses, etc., and starting fresh again."

If all bark and decarburization are removed prior to hardening, there is really very little that can go wrong with high speed steels, providing, of course, precaution is taken to see that these steels are removed from the high temperature after reaching furnace heat but before any wasting of corners or edges occur and before any pebbling is visible. For this reason, unless a controlled atmosphere furnace is employed, it is necessary to watch work continuously as it approaches temperature and to remove it quickly after the furnace temperature has been reached. If controlled atmospheres are used, they should be adjusted to contain at least 8 to 10 per cent carbon monoxide.

A common quenching defect in high speed steel hardening practice is that of not letting the work get thoroughly cold before tempering. This practice should be avoided as it produces brittle structures. Fig. 6 shows the characteristic structure produced by such treatment, consisting of alternate bands of austenite, the product of quenching only, and martensite, the typical temper product. Inasmuch as austenite is more dense than martensite, this duplex structure contains strains caused by the martensite forcing its way into the structure at random locations. A second tempering after complete cooling will eliminate this structure, and a natural tempering of the retained austenite will take place. Tools placed in the tempering furnace before being completely cooled may simply be getting a delayed quench. All tempering should be done at about 1050 deg. F. unless special treatment, such as 900 deg. F. tempering, is indicated to produce greater toughness at the expense of wear resistance and hardness. When possible, a second draw at 1050 deg. F. is recommended.

In general, trouble shooting should be done while designing the tool and trouble should be avoided by proper design and selection of material. This method is far more economical than the trial and error method of having a failure and then setting out to learn what should not have been done. Although often overlooked, it is good policy to invite the man who is going to do the heat treating to sit in at any design conference, as he has information gained in a practical way that will prove invaluable to the design engineer.

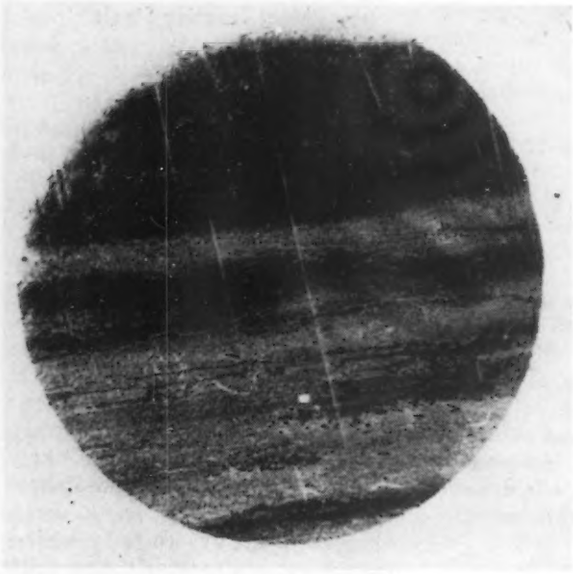
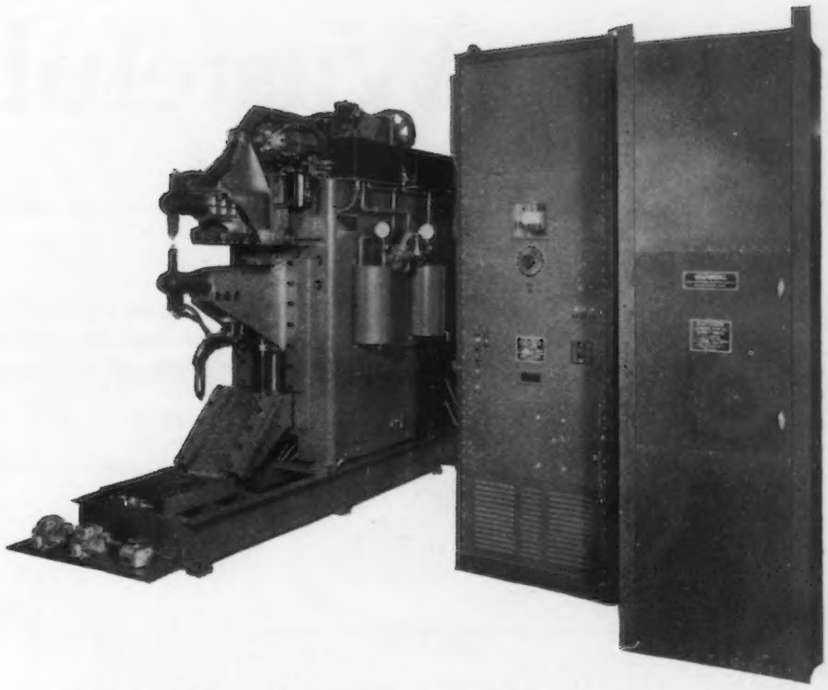


FIG. 6—A banded structure of austenite and martensite occurs when high speed steels are not permitted to thoroughly cool before they are tempered, resulting in extreme brittleness.

Condenser Type Aluminum Spot Welder



THOMSON-GIBB condenser discharge welder with Raytheon control panels is the latest of the stored energy systems.

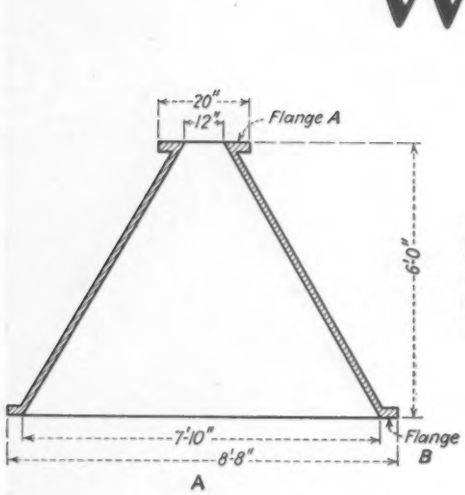
ONE of the latest types of stored-energy systems for spot welding aluminum alloy sheets is the Thomson High-low-High, rocker arm type welder, made by the Thomson - Gibb Electric Welding Co., Lynn, Mass. It is powered by a 2400 mfd. Raytheon condenser discharge unit and will handle up to two thicknesses of ⅛ in. aluminum alloy, also 16-gage stainless steel. The power supply can be any three-phase, 60-cycle line carrying 220, 440 or 550 shop voltage. This three-phase power is converted into high voltage d.c. by a rectifier and used to charge the condenser bank, which is linked to the welding transformer by a control panel. When the circuit is closed, the condenser bank is discharged into the welding machine as a single, unidirectional current impulse during a relatively short period. Since the condenser bank begins to recharge immediately until it reaches a selected energy level during the relatively long non-welding periods, the power input required is relatively low.

The resulting discharge is a wave form with a rapid rise similar in shape to a quarter of a sine wave. When the condensers are completely discharged, the current would tend normally to reverse across the capacitor and begin to recharge the condensers, but this is avoided by a vacuum tube switch which prevents free oscillation of the inductively forced current and causes it to decay as a wave of exponential form. Almost any desired wave form may be obtained by changing the number of condensers in the bank, the condenser voltage or the turns ratio of the transformer. In general, it can be said that shorter duration waves are best for light gages and longer duration waves for heavier gages. Low transformer turn ratios produce high peak, short duration wave forms while high turn ratios produce low peak, long duration forms. Condenser voltage changes alter the amplitude of the wave, but not the shape.

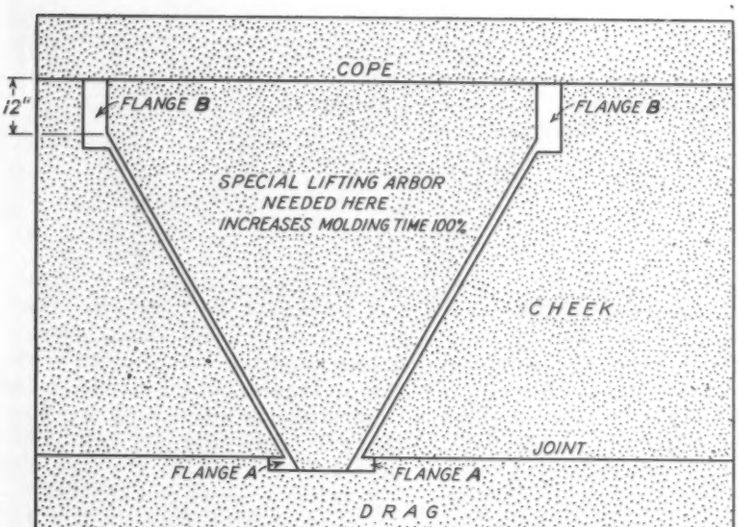
Latest experience indicates that aluminum alloys, because of their highly critical thermal and metallurgical characteristics, require special and precise welding pressure application along with correctly synchronized welding heat. The Thomson High-low-High pressure device provides three stages of pressure application in the correct sequence and amount for the proper initial contact of the sheets, for welding and for quick follow-up forging action which is necessary to insure sound welds in these metals. As soon as contact is established, a pair of air cylinders working in tandem act on the electrodes to provide the initial high pressure. Directly following the establishment of this contact pressure, the control cam makes one cylinder ineffective, leaving only the low inertia, air-lock cylinder to provide the welding pressure. Then, instantly following the current flow, the cam puts the second cylinder into action again to supply the necessary reforging pressure. The different pressures are achieved by mechanical contact within the cylinders so that the change from low to high pressure is instantaneous and is precisely controlled by the cam.

The rocker arm is driven by a 1-hp. motor through a variable speed pulley, giving a speed range of 20 to 60 strokes per min. Throat depth is adjustable from 24 to 36 in. Pressures up to 2500 lb. may be obtained. The lower horn can be mounted in a 45 deg. angle or vertical position, as well as horizontal to provide maximum working area within the arms.

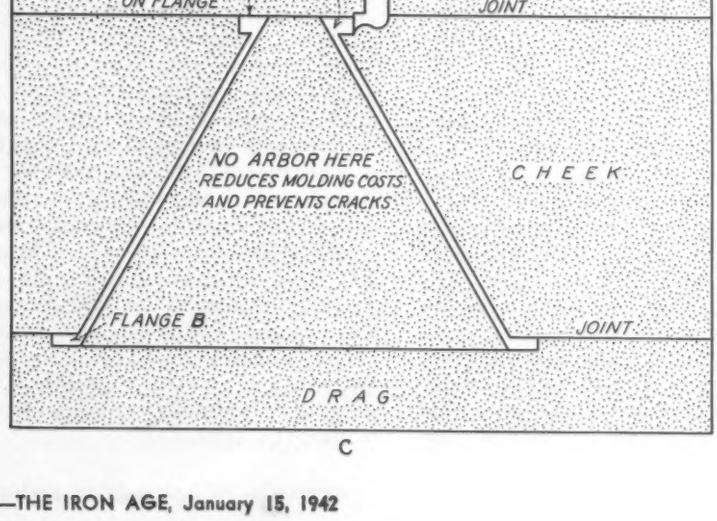
Wasteful Foundry P



A



B



C

FIG. 1—A saving of 4000 lb. of iron was possible by changing the system of gating this cone bottom from the method shown at B to that shown at C.

AT a time when all industry is concentrating on getting the most out of all raw materials, foundrymen would do well to strive to economize in the use of pig iron, scrap and fuel. There are several ways in which a considerable saving could be effected in most foundries without affecting production or the quality of the castings.

One source of savings is in the excessive metal that is sometimes used to produce a given tonnage of good castings. A record of this waste can be found in the foundry cost sheets. When we find a foundry record that shows a low labor cost and a low loss in defective castings, we generally find a good record in "good castings per heat."

Typical of this weight problem, is that of a foundry which was proud of its foundry record. However a study of these records indicated that the foundry had melted 100 tons of iron to produce 46 tons of good castings, making its percentage of good castings to a heat 46 per cent. On this class of work a plant should obtain at least 78 per cent good castings.

In this instance 32 per cent more iron and fuel was used than was necessary to produce the castings. There are a number of factors in foundry operations which can contribute to this loss.

Cupola Practice Important Factor

One factor is poor judgment in estimating the quantity of metal required to pour the molds on the floor. Poor cupola practice is another factor. It is wasteful and bad practice to allow 3000 to 4000 lb. of metal to run out of the spout at the first tap in order to get metal hot enough to pour the molds.

The remedy for this type of waste is to build up a good bed in the cupola. The bed must be high enough and all the wood used to start the fire must be burned out and charging should not be started until the bed has burned cut.

One black spot on the surface of

Practice

By PAUL R. RAMP

. . . Much vitally needed pig iron, scrap and fuel are unnecessarily wasted each year, the author claims, through inefficient gating, feeding and melting practice. He lists herein typical examples of such waste and how they may be corrected.

the bed will seriously affect the temperature of the first iron taken.

There is no economy in establishing a time limit as to when to light up the cupola and when to begin charging. This must be controlled by the weather, the condition of the fuel and the surface of the burned-through bed. Nothing is saved by cutting the time between the lighting of the cupola and charging if the bed is not burned through.

What additional fuel may be used to assure a well burned bed and to bring it up to the proper height will more than pay for itself in permitting the first iron to be used directly for pouring molds, instead of being poured into the pig bed. This is true all through the heat.

Good Bed Is Necessary

If a start is made with a good bed and if the iron is hot, it can be handled longer and transferred from one ladle to another and poured into molds instead of being pigged and wasted.

Molding methods have a great influence on iron waste. There are many molds that the experienced foundryman knows do not require all the heads and risers that some men believe necessary to get a good casting.

An example of this is the cone bottom shown in cross section in Fig. 1(a). Fig. 1(b) is a cross section of the cone bottom mold as handled in some foundries. The casting was molded in this manner because it was thought necessary to feed the large diameter flange with a heavy feeding ring. In order to mold it this way, it required 16 additional hours to make the mold. In addition, 4000 lb. of extra feeding ring iron (and the fuel required to melt it) was also wasted. In addition the flange B was weak because of slow cooling.

In Fig. 1(c) is shown the proper way to make and feed this type casting. A 4 in. riser (shown at

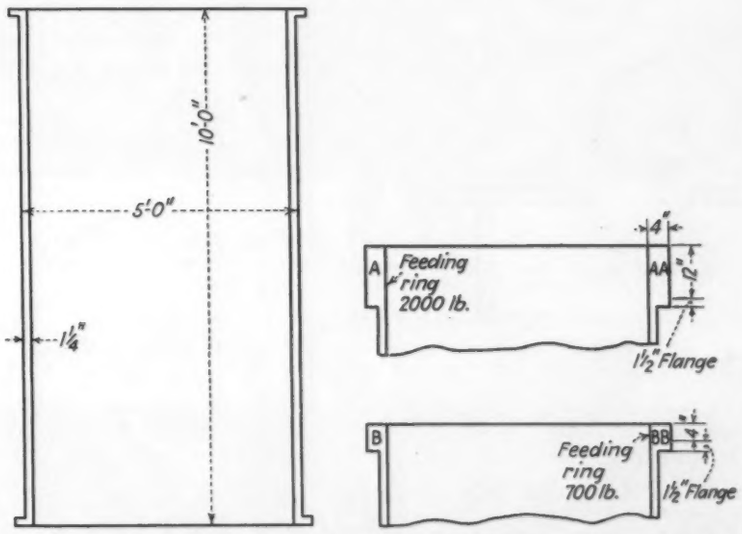


FIG. 2—Using a 4-in. head to feed this high belt casting, in place of the 12-in. head previously used, resulted in a saving of 2000 lb. in amount of metal needed to pour the casting.

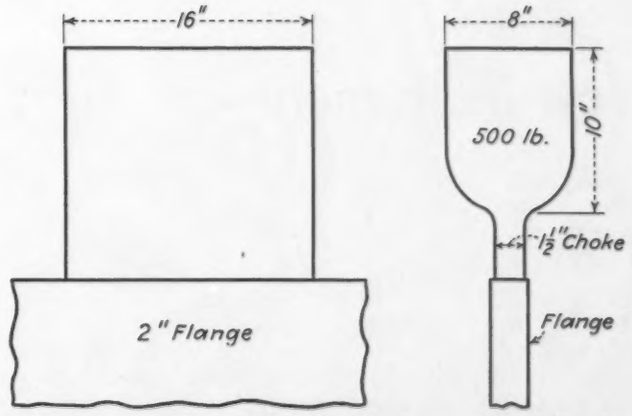


FIG. 3—Balloon risers of the type shown here are wasteful and can often be eliminated by the judicious use of chills.

F) is all that is necessary to properly feed this casting.

Another type of waste is often encountered in making castings similar to that shown in Fig. 2, which is a cross section of a high belt casting. Some 50 years ago, it was thought necessary to have a 12-in. feeding ring at A and AA, Fig. 2. This type of feeding ring gives a waste of 2000 lb. of metal and it has been proved many times that the 4-in. feeding head (B and BB) gives ample feeding to the casting.

The feeding method shown at B and BB in Fig. 2, represents a reduction of 1300 lb. in the amount of iron required and gives a sounder and stronger flange section.

A "balloon riser" is shown in Fig. 3. The writer has observed four of these metal wasters used on flanges of a tube ring under the misguided impression that the tube ring could be fed through the flange. The real solution to this feeding problem would have been to have several properly placed chills lower down at the point where the heavy metal was pulling.

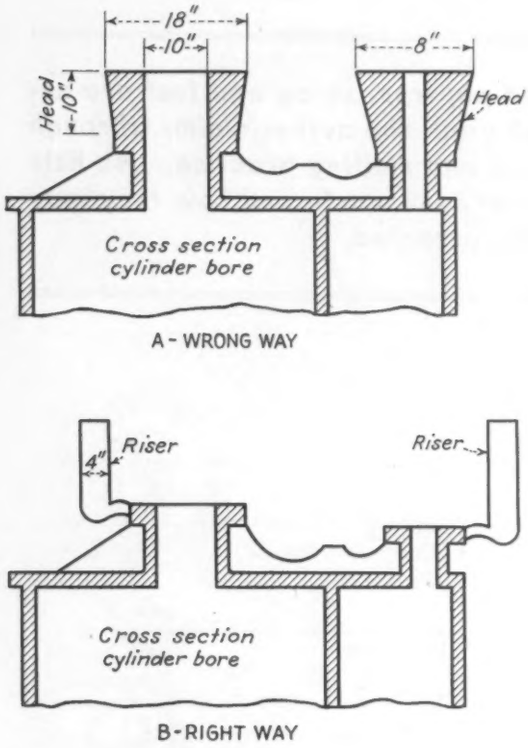


FIG. 4—Small 4-in. risers were successfully used to replace the 10-in. heads originally used in producing this marine cylinder; another example of how good gating practice can save metal as well as improve quality.

A section of a marine cylinder showing often used but wasteful feeding heads over the stuffing box flange and the smaller flange is illustrated in Fig. 4 (a). These heavy chunks of metals were put on the casting with the intent of feeding the castings, through then it is a well known fact, however, that no feeding will take place after the wall of the stuffing box has solidified. The result of using such heads is a waste of metal and a much weaker stuffing box flange. The proper way to feed such a casting is shown in Fig. 4 (b). Shrinkage is unlikely to occur if such a method is used and the molds and cores are properly vented and thoroughly dried.

There is, of course, some types of work where feeding heads are most essential, as for example on rolls. But if the action of the metal after it enters the mold is carefully studied, a good deal of waste metal can be eliminated.

In the production of small castings, many savings in metal can be realized by intelligent use of gates and risers. The writer has observed some plants using enough gates, risers and heads on a single casting to furnish enough metal for a small foundry.

It is essential today that gating practice be based on a thorough knowledge of the behavior of metal, not upon rule of thumb methods.

Ample data on feeding and gating practice is available today through technical publications and technical associations. Using obsolete and inefficient methods at a time when pig iron is almost worth its weight in gold is being unnecessarily wasteful.

New Instrument for Alloy Check-Analyses

A NEW apparatus, known as the Identometer, developed by Metals Research Apparatus, Inc., Pittsburgh, makes rapid check-analyses of metals and alloys by means of a newly developed form of thermocouple. The instrument is simple in operation and construction, making it suitable for general use in laboratories, shipping rooms, inspection stations and tool rooms, and for research work on new alloys.

The Identometer may be set to operate on any available electrical system, but has been standardized for a 110-volt, 60 cycle a.c. circuit. To run a check-analysis, the sample to be tested is fastened with clamps to silver contacts and held tightly against a similarly mounted "reference" sample of known composition. A high current circuit, built up in the apparatus, is then closed for about 2 sec., sufficiently long to form a weld at the point or along the line of contact of the two samples.

By means of a two-pole, double-throw rotary switch, the welding circuit is then opened and a galvanometer circuit instantaneously closed and allowed to remain closed

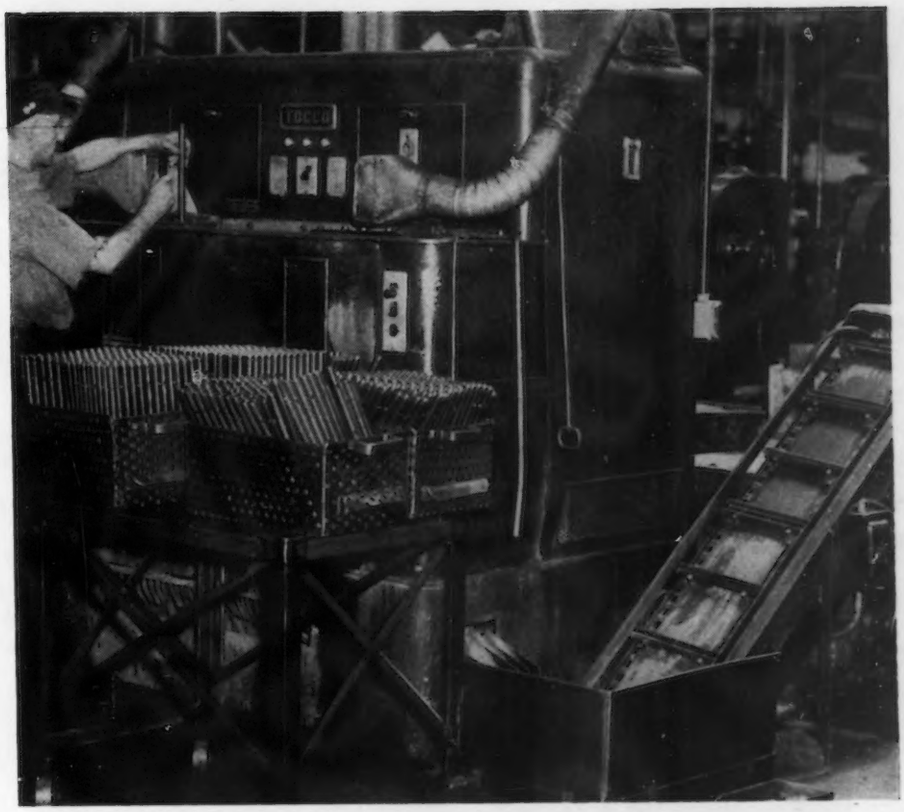
(CONCLUDED ON PAGE 95)

Induction Hardening Saves Copper

BEFORE induction hardening was adopted by a large Michigan automobile plant, copper bushings were used in the rocker arm to prevent it from wearing out the shaft. Increasing the shaft hardness from 20 to 50 Rockwell C by high frequency heating and quenching has resulted in a hardness sufficient to prevent shaft wear when the rocker arm is used without the copper bushing. Nearly 5,000,000 shafts have been processed during the past two years without a single reject that could be traced to improper heating. Since about 14,000,000 copper bushings, weighing 4/5 oz. each, were needed annually, a yearly savings of 350 tons of copper resulted.

In the manufacture of rocker arm shafts, the steel is cut in 12½-in. lengths out of ¾-in. bar stock, and ground. Shafts are then bored, counterbored, and faced for length simultaneously in one machine at the rate of 185 per hr., using 26 machines to maintain the present schedule of 12,000 units daily. The shafts are hardened inductively by a "two shot" process, necessary because localized hardening at six different points around each oil hole in the shaft is desired. Units are dropped into holes where they are held in position by a cam supporting the end. High frequency current from a Westinghouse 240 kva., 3000 cycle generator is applied at three sections which are heated to about 1500 deg. F. and quenched. The cam then releases the shaft causing it to drop 2 in., and the process is repeated. Hardening of the entire shaft is not desirable, as it would become brittle and susceptible to breakage.

Shafts are hardened six at a time in an upright hardening furnace in which the heating and quenching cycle is 4½ sec. No oxidation of the surface results, and there is no grain growth of the unhardened metal sections. Although there is some distortion of the hardened shaft, further machining except for finish grinding and lapping is unnecessary.



ABOVE

ROCKER arm shafts are hardened in sections in this high frequency induction heating machine. The short heating and quenching cycle enables one machine to harden 12,000 shafts daily, enough for 1,000,000 cars a year.

BELOW

ROCKER arm shafts are hardened in this 3000 cycle generator that supplies high frequency power. The shafts are hardened to between 59 and 51 Rockwell C.

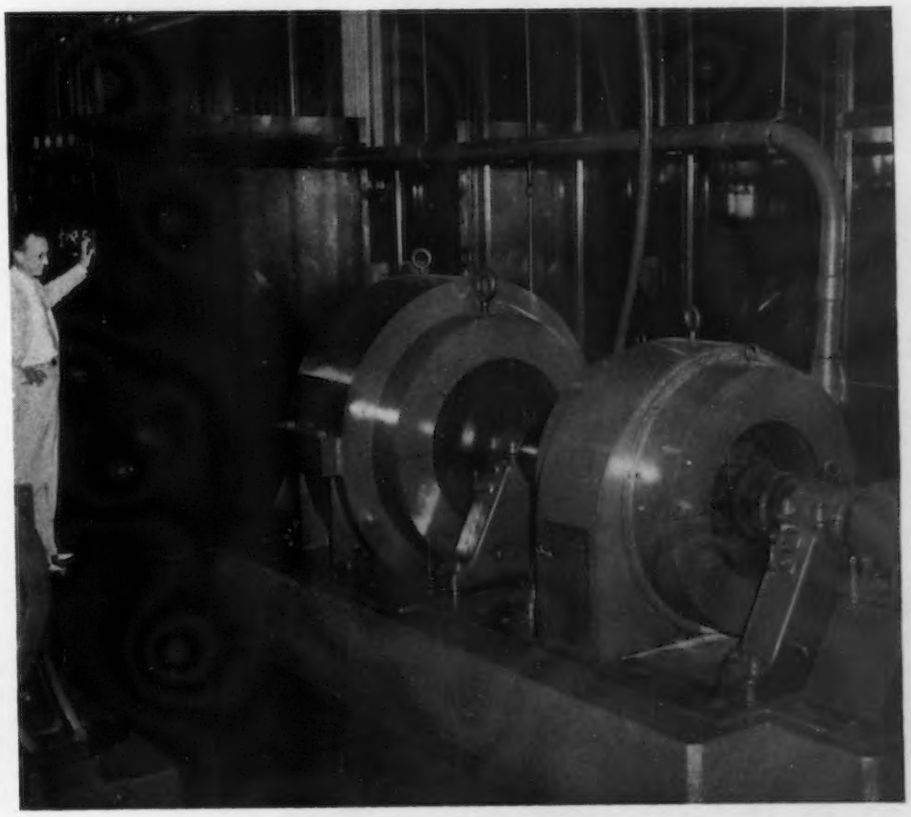
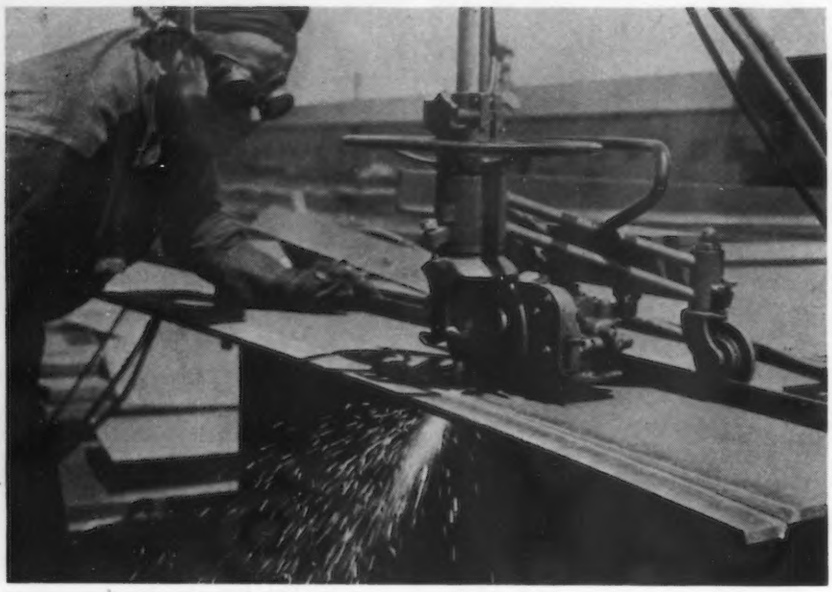
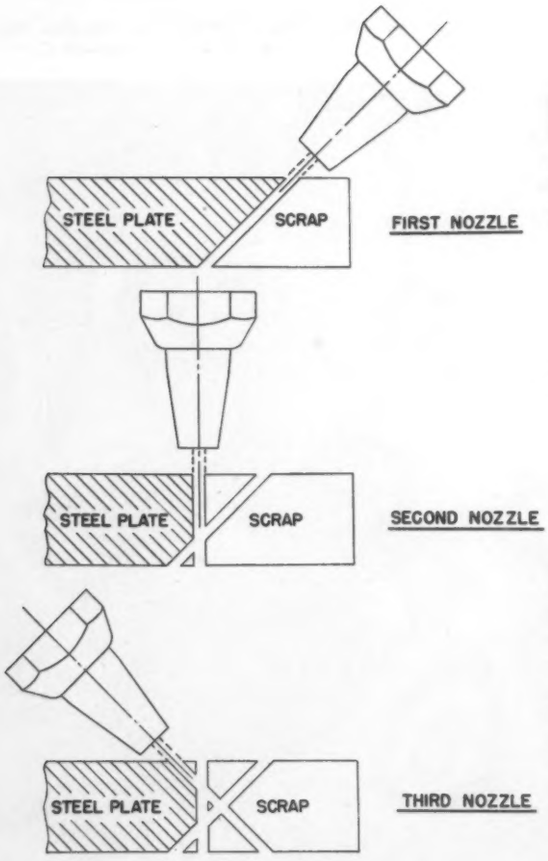


Plate Cutting in Ship



ABOVE

FIG. 1—A simple form of small, portable motor driven gas cutting machine which travels on portable track or directly upon the plate.



LEFT

FIG. 2 — Sequence of cuts for double beveled plate with unbeveled root face. In machine cutting, three cutting nozzles are closely coupled and the plate is beveled with one pass of the machine.

ALTHOUGH the adoption of welding has eliminated much of the layout work formerly required in the shipyard mold loft, and greatly simplified the preparation of steel for the ship, the cutting of plate edges for welding is as important as proper shearing and punching for riveting construction. Accurate preparation is necessary not only for structural reasons but for economic reasons. Lap joints can of course be used without accurate sizing of plate, but welded lap joints are uneconomical of plate, add useless weight to the ship, increase welding costs, and complicate the details of construction. They are rarely used except when welding is applied as the method of joining on a structure originally designed to be riveted.

Welded construction, therefore, led to a careful consideration of plate-edge cutting; and since plate planers are costly to install and cannot be quickly obtained, attention naturally focused on flame-cutting equipment for cutting and beveling plate edges. The advantages of flame-cutting for plate-edge preparation over planing, particularly at the present time of great shipbuilding activities, can therefore be summarized as follows:

(1) High speed of production
(2) Availability of equipment
(3) Low cost of equipment
(4) Low cost of power
(5) Low investment charges on equipment since major operating charges are for labor and consumable materials used only during production.

The cutting flames impose no external loads on the plate and, therefore, heavy holding clamps, large tool-driving motors and massive installation foundations are not required. The hand-operated cutting blowpipe cannot be satisfactorily used for any but the shortest seams, since manual guiding causes irregular edges and bevels. Though such irregularly fitted edges can be welded, the sacrifices in welding speed and the cost of extra weld metal

ip Construction

By F. G. OUTCALT and J. M. KEIR
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. . . The first of two articles on cutting and welding in the ship-building industry. The second article will deal primarily with automatic arc welding by the Unionmelt process. These data have been abstracted from a paper presented before the 1941 annual meeting of the American Welding Society.

and labor more than outweigh the apparent convenience of manual torch cutting. Much of the plate preparation for welding is now done with blowpipes mounted on small, portable, motor-driven carriages which travel in straight or curved paths on portable track or directly on the plate. Fig. 1 shows one unit which can be guided by track or can be accurately steered by the operator to make cuts almost equal to those obtainable with track guidance.

Many of the early types of these machines carrying one blowpipe are still in use for cutting plain square edges or single beveled edges and are sometimes used for cutting more complicated edge preparations by means of two or three passes of the single blowpipe. However, accuracy is difficult to obtain in this manner of multi-pass cutting because the tendency of each successive heating and cooling to warp the plate is cumulative, and compensation or correction is practically impossible.

A more advanced procedure of plate edge preparation involves the use of two or three blowpipes or specially connected cutting nozzles so adjusted that the two or three surfaces are cut during one passage of the machine. The most complicated edge preparation of any commonly used for welding is the double bevel with unbeveled root face. The sequence of cuts for this kind of edge preparation made during one pass of a machine having three closely-spaced cutting nozzles is illustrated in Fig. 2. This operation is more economical of gases than the making of three similar but separate cuts in three passes, and the total heat effect tending to distort the plate is but little greater than the heat effect of a single cut.

If bevels are to be cut with their top and bottom edges truly straight, the ends of the blowpipe nozzles must travel at uniform distances from the plate surfaces as well as in a plane perpendicular to the plate and parallel with the finished edge. This can be accomplished by arranging for the blowpipes to rise and fall so that the distance between nozzles and plate surface will remain constant at all times, even when cutting a wavy plate.

An example of this type of cutting machine is shown in Fig. 3. The cutting nozzles are attached to the lower end of the vertical shaft which is free to move up and down in accurately fitting roller guides. The weight of the floating assembly is supported on a wheel riding directly on the plate surface adjacent to the cut. When long cuts are to be made with this type of equipment, it is essential that the track on which the blowpipe carriage operates be straight and level. To provide and maintain accurate track alinement, it is necessary to have firm foundations and rigid track mounting.

In some shipyards, a single straight section of track is installed on a permanent mount. The plate must be accurately positioned for cutting and turned after each cut to bring a new edge to the line of cutting. In other yards, plate handling time and cutting time have

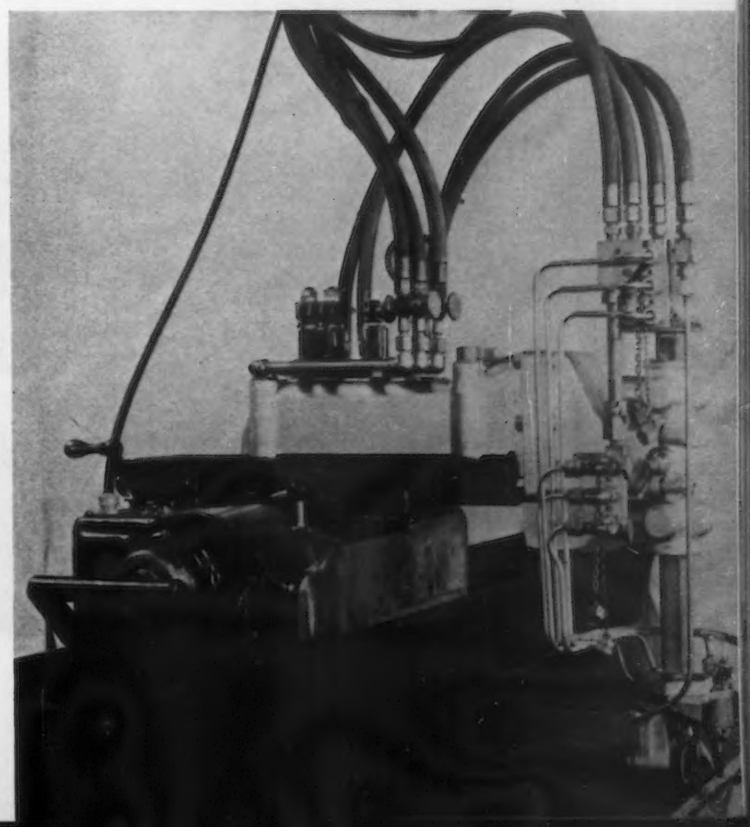


FIG. 3—With this type of floating assembly for the blowpipes, the distance between the nozzles and the plate edge remains the same regardless of any waviness in the plate, and heavy clamping of the plate is unnecessary.

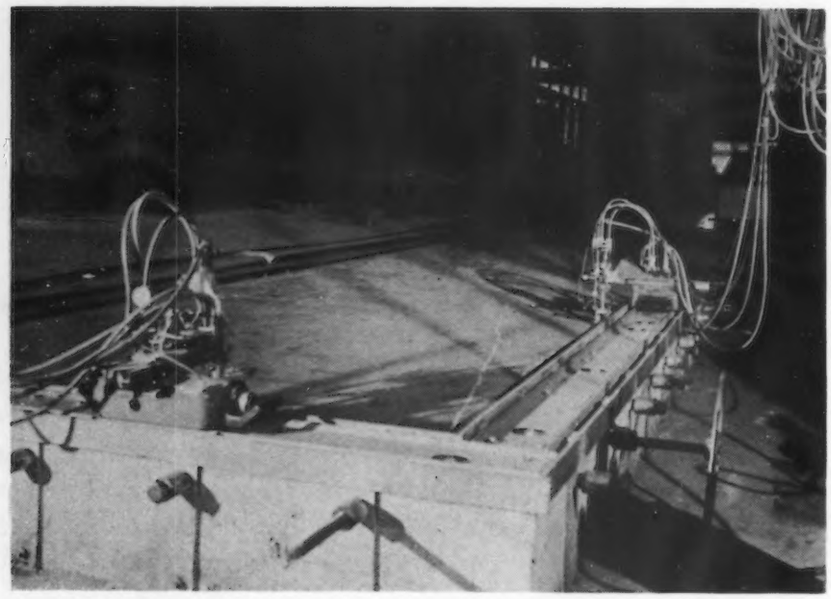


FIG. 4—Cutting time on plate has been reduced by making two cuts at once through the use of an L-shaped track and two cutting machines operating simultaneously.

been reduced by using an L-shaped track with two machines, one traversing each leg of the L, Fig. 4. In this way, two cuts at right angles are made at the same time without changing the position of the plate. Pillar supports with or without casters to permit the easy positioning of plate can be used with such a set-up.

Another arrangement now in use still further mechanizes flame plate edge preparation. This machine, called the "flame planer," makes use of the same type of carriages and the same arrangement of cutting nozzles as are used in the single track and L-track installations, but it requires crane service only for the delivery and removal of the plates. This machine also makes possible a reduction of the total time of cutting any plate to approximately that required for making the longest cut, and minimizes layout time and manual labor. As shown in Fig. 5, the flame planer consists of three separately controlled, closely coupled, roll table conveyors over which the cutting machines travel on movable bridges. On the three separately controlled roller table sections, the plates are received, cut and discharged. The plates move from one section to the next on the live, motor-driven rollers of the conveyor table controlled through conveniently located push buttons.

At the cutting section, mechanical means are provided for alining the plate and holding it in position during the cutting operation. At both sides of the cutting bed are accurately positioned rails on which operate the movable bridges carrying the cutting equipment.

For the simultaneous cutting of four edges of a plate, three bridges

FIG. 5—This "flame planer" is capable of preparing four edges of the plate for welding at once. Three bridges are provided, although only two are seen in this view. The middle bridge in the foreground carries two cutting units for the longitudinal edge preparations and the two end bridges (one shown) carry the mechanism for transverse cutting of the plate.



Production Data for Gas Cutting Ship Plate on Machine Shown in Fig. 5

Plate Thickness, In.	Type of Edge Preparation	Approximate Time and Gas Consumption per 10 Ft. of Plate Edge: Cutting Time, Min.	Gas Consumption, Cu. Ft.: Oxygen	Acetylene	Approximate Operating* Time (Min.) for Plates of Different Lengths, in Feet: 16	18	20	22	24	26	28	30	32
5/16	Square edge	6	7	1.0	9.5	11	12	13.5	14.5	16	17	18	19.5
	Single 30° bevel	6	9	1.4	9.5	11	12	13.5	14.5	16	17	18	19.5
	Single bevel and nose	7	12	2.2	11.5	13	14	15.5	17	18.5	20	21	22.5
	Double bevel and nose	..	..	....	....	....	....	....	....	....	....	....	....
1/2	Square edge	7	9	1.2	11.5	13	14	15.5	17	18.5	20	21	22.5
	Single 30° bevel	7	16	1.7	11.5	13	14	15.5	17	18.5	20	21	22.5
	Single bevel and nose	8	19	2.5	13	14.5	16	18	19.5	21	22.5	24	25.5
	Double bevel and nose	9	36	6.4	14.5	16.5	18	20	22	23.5	25.5	27	29
3/4	Square edge	8	16	1.5	13	14.5	16	18	19.5	21	22.5	24	25.5
	Single 30° bevel	8	21	2.1	13	14.5	16	18	19.5	21	22.5	24	25.5
	Single bevel and nose	9	44	4.3	14.5	16.5	18	20	22	23.5	25.5	27	29
	Double bevel and nose	9	48	6.4	14.5	16.5	18	20	22	23.5	25.5	27	29
1	Square edge	9	19	1.7	14.5	16.5	18	20	22	23.5	25.5	27	29
	Single 30° bevel	9	24	2.4	14.5	16.5	18	20	22	23.5	25.5	27	29
	Single bevel and nose	10	56	5.0	16	18	20	22	24	26	28	30	32
	Double bevel and nose	10	61	8.3	16	18	20	22	24	26	28	30	32

* Cutting of long edges governs overall cutting time. Since both of these are made simultaneously by movement of the same carriages, the time of travel of this carriage is equal to the overall production time of cutting all four edges of a plate.

are provided. The middle one carries two cutting units which make the longitudinal edge preparations and are easily adjustable to any position on the span across the roll table. Floating mountings for the cutting heads are also used on these units so that the cuts will follow any waves in the plate.

The two end bridges carry the mechanism for transverse cutting of the plate. These end bridges are provided with ball-bearing wheels for easy movement to any desired position along the main side rails, and can be quickly and securely locked in place. On each of these bridges is mounted a standard motor-driven carriage like those pictured in Fig. 3. Any of these units can be fitted with nozzle blocks carrying one, two or three nozzles for cutting a straight, square edge, a single bevel, a single bevel with unbeveled root face, a double bevel, or a double bevel with an unbeveled root face. The desired edge contour is, of course, finished in one single passage of the group of cutting flames along the plate. A number of identical plates can be cut very rapidly. Furthermore, the adjustments of the machine are so easily made that little time is required even if each plate is of different dimensions. Plates with curved edges and plates of irregular shape can also be cut by means of special attachments or by manual operation of the positioning controls.

The accompanying table presents some production data based on the actual operation of this machine in a West Coast shipyard.

It is noteworthy that even for the most complicated double-vee and square-root-face preparation of 1-in. plate, the time required for complete preparation of all edges of a rectangular piece is only 1 min. per ft. of longest plate dimension.

The development of an accurate and rapid method of plate-edge preparation was fostered to a great extent by the development of rapid methods of welding and the consequent need for accuracy in plate alinement for butt joints. It was not until the need for this alinement accuracy for automatic electric welding focused attention on edge preparation that the great advantages of accurate and uniform fitting of plate edges for manual arc welding were fully appreciated. Unfortunately, there are still many who are unwilling to insist on careful edge preparation because they think costs will be increased. Actually the net total cost is usually decreased because of the savings in welding expense made possible by the elimination of poorly fitted joints. (See "How to Avoid Poor Fit-Up in Arc Welding, THE IRON AGE, Nov. 6, 1941.)

Ed. Note:—Next week the authors will conclude with detailed data on automatic arc welding in ship construction.

New Brass Embossing Dies

THESE half-hard, engraved brass, embossing dies, made by the Acromack Corp., Elizabeth, N. J., have been found to give long life in embossing designs and lettering into soft brass, copper, zinc, tin, aluminum and terne plate name plates and tags. It is said that the cost is about one-third the cost of



steel dies. To use, the male die is screwed to a die shoe and the female die is screwed to a holder in the ram of the press. Assembly may be made in any punch press and several interchangeable sections may be assembled for use simultaneously.

Silver Plating Technique

By ADOLPH BREGMAN
Consulting Engineer, New York

. . . Discussions of high speed silver plating, bath and work agitation, plating density control, and the construction of plating tanks complete this series of two articles on substituting silver plating for nickel and chromium plating in commercial applications.

AN important consideration in all plating work is the distribution of the deposit as evenly as possible over the work. However, in silver plating, because of the high cost of the metal, it is especially important. It may be estimated roughly that in order to provide for a minimum deposit on all surfaces of an article, some parts of the work may receive twice as much plate as others. Clearly, this excess of silver should be avoided if possible. Even distribution of deposit may be effected by the proper design of racks to some extent, but for most economical operation, agitation must be employed.

Agitation decreases the throwing power and distribution, but allows the use of higher current density with resultant faster plating and brighter deposits. The higher current density tends to give better distribution up to a certain point. Agitation may be either of the solution or the work. Both methods have been used, but more recently the second type, the moving cathode, has gained favor. Movement of the work agitates and thereby enriches the depleted solution immediately surrounding the work. This is important because of the comparatively narrow limits within which the solution will produce satisfactory work. Not only should the silver be deposited evenly in order to save metal costs, but it should be in a "soft" condition so that it may be easily buffed, polished or burnished. Agitation of the solution by air is not advisable because carbon dioxide in the air decomposes the alkali salts in the solution and may cause roughness of deposit.

In the agitation of the cathode or work, a number of movements are possible. Forward and back in the direction of travel, side to side, up and down, rotation, and combinations of all these movements have been found suitable. The speed of motion is vitally important, and must cause minimum disturbance or turbulence of the solution. Other factors are the length of stroke and the distance between anodes and cathodes. A number of very interesting, and in some cases complicated, motions have been developed, especially in the silverware industry, as the result of large scale experimental work, with great improvement in quality, character, distribution and protective properties of the deposit.

For the successful application of very thin, pore-free deposits, Dornblatt[5] found that it is essential to keep the solution clear and free from suspended solid matter, that is, "optically clear," or, so clear that a beam of focused light passing through the solution is not visible when viewed at right angles to its path. When even minute particles are present, they will be visible like dust in a sunbeam, and this high degree of clarity can be obtained only by filtration. Continuous filtration can be practiced, but unless care be taken to avoid the stirring up of sediment and the introduction of air bubbles, it can do more harm than good. Periodic filtration is generally practiced, using activated carbon to remove harmful colloidal material. However, activated carbon removes the carbon disulphide as well as other colloidal particles, so it is necessary to add fresh carbon disulphide as it is removed. Siliceous filter aids, such a diatomaceous earth, are not advised where especially thin pore-free deposits are desired since they

[5] *"Silver in Industry," edited by Addicks, Chapter 10, Electroplated Silver Coatings, by Dornblatt and Simon, p. 246.*

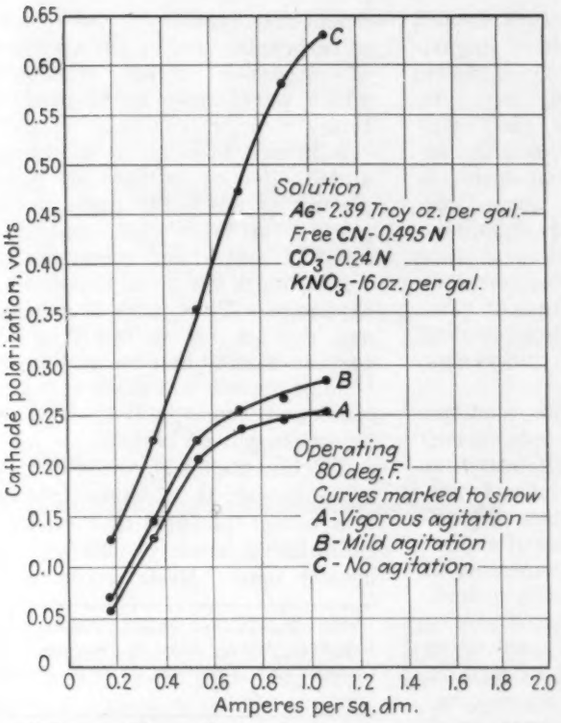


FIG. 4—The effect of agitation on cathode polarization in a nitrate cyanide bath, for silver plating. Photo courtesy of the Electrochemical Society, Inc.

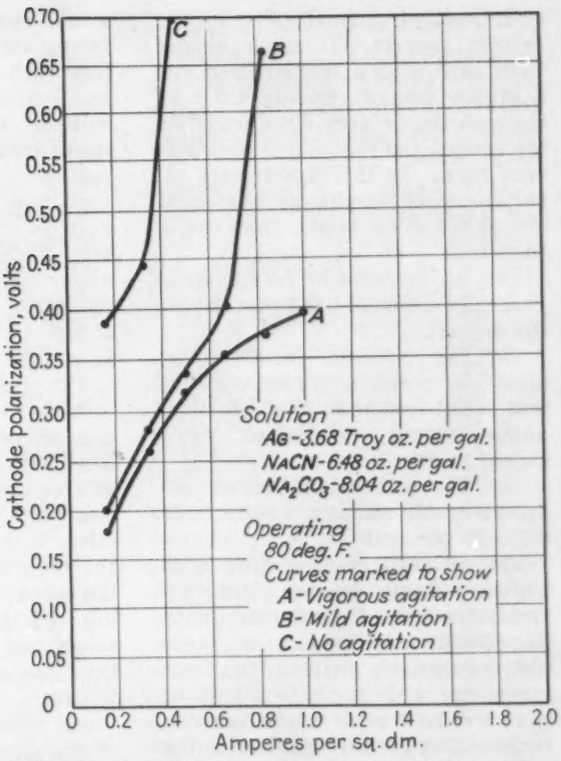


FIG. 5—The effect of agitation on cathode polarization in a sodium cyanide bath in silver plating. Photo courtesy of the Electrochemical Society, Inc.

sometimes leave flakes of silica in the bath. Anode bags and covers over the tanks to exclude dust, are also suggested.

Chilling of the bath is effective for precipitating carbonates and iron as ferrocyanide. In the potassium nitrate-cyanide solution, calcium nitrate can be used to precipitate carbonate. Chilling may be accomplished in the small shop simply by the addition of ice, in the large shop by cooling coils, or, in winter, by leaving the plating room without heat over the week end.

Control of the bath is maintained by chemical analysis to regulate the concentration of silver, carbonate and free cyanide. The additions of carbon disulphide are determined by the appearance of the plate. Standard methods of analysis may be found in a number of places in the literature.[9]

[9] *U. S. Bureau of Standards Research Paper No. 384; Plating and Finishing Guidebook, 1941; and "Simple Methods of Analyzing Plating Solutions," Hanson-Van Winkle-Munning Co.*

High-Speed Plating

High grade articles such as tableware are plated in cold solutions at low current density as previously described, and the work is left in the bath for a considerable time. In the studies made by the Silver Producers' Research Project[10] it was realized that such slowness, however acceptable in high grade work, would make mass production at a low price difficult. Accordingly they conducted a series of experiments using a much higher current density, the solution meanwhile being vigorously agitated. This idea was not new, having been discussed in literature on this subject. Mesle, for instance, described the plating of silver at 200 amp. per sq. ft. In this research, a "tin can" cathode was enclosed in a bakelite chamber into which the solution was forced by a water-circulating pump. In the test apparatus the solution was changed about 25 times per min. Deposits were obtained at about 100 amp. per sq. ft., adherent and of good appearance, of low porosity, about 0.0001 in. thick, in about 1 min. This apparatus is shown in Fig. 6.

[10] *"Silver Plating at Very High Current Densities," by Simon and Lumley, Transactions American Electroplaters' Society, 1940, p. 91 to 95.*

The pre-plating cycle consisted of: (1) Vapor degreasing, (2) cathodic cleaning, (3) acid dip, (4) copper strike, and, (5) silver strike. Rinses were inserted after each operation and the silver strike was followed by the silver plating operation. With this type of experimental apparatus it was found that the following factors appear to govern the plating of cylindrical steel bodies:

(1) The permissible current density to produce smooth adherent deposits may be increased by: (a) Increasing the silver content of the bath; (b) increasing the content of free cyanide; (c) increasing the temperature, and (d) increasing the agitation. Under favorable conditions, with good agitation, current densities of 200 amp. per sq. ft. could be used, at which over 0.0002 in. thickness of silver could be deposited in one minute.

(2) The cell voltage in these tests ranged from 4.5 to 7.5 volts. The current density produced by a given voltage was slightly decreased by raising the silver content and was increased by raising the free cyanide or by raising the temperature. The principal cause of these effects was the change in conductivity of the solution.

(3) Cathode polarization appar-

ently had only a small effect on the current density. If silver anodes were used with a smaller area and a higher current density than on the cathodes, a black film formed on the anodes and the polarization was very high. In the experiments reported, steel anodes of the same size as the silver anodes were therefore used.

(4) An increase in free cyanide generally decreased the porosity of the deposit.

(5) The porosity of silver applied over pore free copper coatings was much less than that of silver applied directly to steel or over a copper strike.

(6) The cathode efficiencies under favorable conditions were from 60 to 70 per cent.

The advantages of plating with higher current densities are: increased speed of production with its attendant reductions in labor cost, equipment, installation, floor space, etc. It is hoped that further work will be done to bring high current density plating of silver to the commercially practicable stage.

Anodes

Pure silver anodes, 99.95 per cent fine, are almost universally used and their quality is judged by their appearance in operation. Satisfactory anodes maintain a dull or matte, light gray color. If they should develop a dark or black scum some of which might loosen and enter the bath, rough deposits would result. This "black anode" formation is the result of impurities such as lead, iron, bismuth, manganese, tellurium, selenium, sulphur or antimony, and may cause trouble even though the actual total of these impurities is very low. With high anodic current density or low free cyanide, a high surface concentration of these impurities or their salts forms on the anode. Another cause of black anodes may be high iron content, as well as sulphide or thiocyanate, in the plating solution.

A partial cure for this condition may be the use of low anode current density and a higher concentration of free cyanide, or periods of inaction when these impurities may dissolve. In the manufacture of anodes, the high temperature annealing of the rolled silver followed by quenching will keep the impurities dissolved in the silver, preventing their precipitation and segregation at grain boundaries where they would otherwise concentrate. Small or fine grain size in the anode will produce more grain boundary area and consequently a greater dispersion, or reduced concentration of impurities.

The ratio of anode to cathode area is generally about 1 to 1, keeping the anode polarization around 0.1 or 0.2 volts. A rise in anode polarization up to 0.5 volts would aid in the development of the "black anode." Anode polarization voltage is held down by the presence of sufficient free cyanide, by the removal of carbonates, and by the avoidance of excessive carbon disulphide which would raise anode polarization.

Although broadly, as previously stated, the equipment for silver plating is much the same as for plating other metals, additional items of control equipment are advisable since the metal deposited is expensive. Thus amp.-hr. meters and devices for determining the current density and controlling the time of deposit will make sure that the deposit comes up to the required thickness, but no higher.

The best means of controlling the silver deposit is, of course, plating to a known thickness by regulating the plating time to the current density used. Mesle[4] recommends a current-density meter consisting of an ammeter to which has been attached a cathode of known area. For example, this may be an anode 2 x 3.6 in. or 1/20 of a sq. ft., insulated on one side. The distribution of the average current-density used over the surface of a 20-in. platter can be determined by placing the current-density meter cathode close to the platter with the insulated side toward the platter and noting the amperes flowing at dif-

[4] *"A Resume of Silver Plating," by Frank C. Mesle, presented before Electrodepositors' Technical Society, London, 1937.*

FIG. 6—This experimental apparatus is used for silver plating at high current density. Photo courtesy of Handy & Harman.

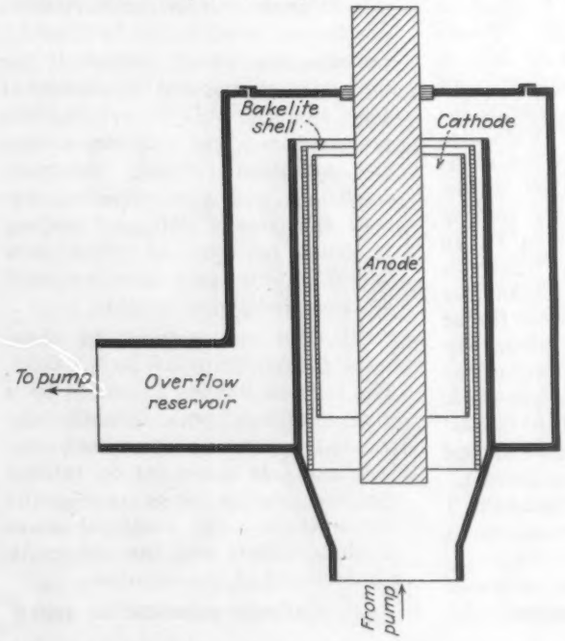
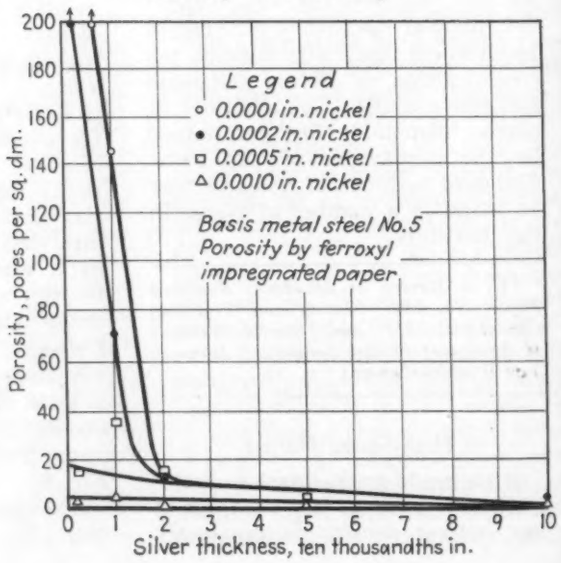


FIG. 7—The effect of nickel undercoat on the porosity of silver deposits. Courtesy of American Electroplaters' Society.



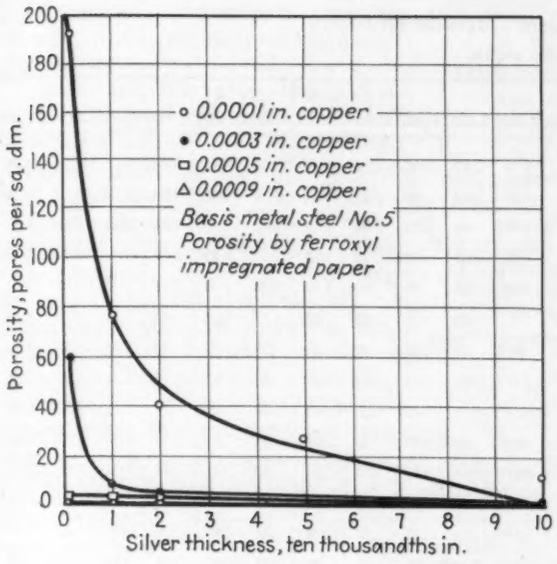


FIG. 8—The effect of copper undercoats on the porosity of silver deposits. Courtesy of American Electroplaters' Society.

ferent places on the surface. On this meter, 0.1 amp. indicates 2 amp. per sq. ft. at that time and place on the platter. At the center of this platter the meter may show 0.2 and this will increase as the meter is moved toward the edge of the platter, where it may show 0.8 amp. The current-density at the center would be 4 and near the edge 16 amp. per sq. ft.

If the plating time is known, a current-density meter can be used to measure the thickness of the plate. A measured thickness of silver can be plated at any place desired on the surface of the cathode by measuring the current-density used and fixing the time of plating.

Drag-Out

An item in the operation of silver solutions which must not be overlooked is the cost of drag-out, which, even in the case of base metal solutions, is measurable, but in the case of silver is very considerable and must therefore be kept to a minimum. For this purpose two rinse tanks should be installed. The No. 1 rinse consists of still water which is saved and used, with additions, to replenish the silver tank. This still water rinse may also be operated with electric current, insoluble anodes and silver cathodes to recover the silver from the rinse. It may be operated at about 2 volts and at a low amperage (2 or 3) to avoid affecting the work in the rinse, where it might act as an intermediate electrode.

Another worth while measure is the recovery of the metal from the No. 2 running water rinse by running the waste line through a barrel packed with excelsior and mossy zinc to precipitate the silver from the rinse water by replacement.

An interesting, although perhaps extreme, example of the effect of drag-out on a silver solution, and therefore on the cost of operation, is a case[11] in which small articles made of antimonial lead were given a silver strike and then transferred directly to a silver plating solution without an intermediate rinse. Analyses made of the free cyanide content of the plating bath were as follows:

Date	Free NaCN oz. per gal.
11- 1-40	3.50
11-15-40	3.88
1-22-41	4.02
2-13-41	4.32
3-26-41	5.13
5-16-41	6.30
7- 9-41	6.27
8-14-41	6.74
10-15-41	7.30

The increase in the free sodium cyanide content of the regular silver plating bath is the difference between the drag-in from the strike and the drag-out from the plating tank. Even though the operators were careful about drag-out from the plating solution, they were not concerned about the drag-out from the strike, thinking that it went into the plating solution and was thereby saved. However, their eyes were opened by the steady increase in free cyanide of the plating solution from month to month as a result of dragging in the strike solution. It can be readily understood therefore, how important it is to save the drag-out from the regular plating solution.

The use of silver plating in industry calls for the minimum weight of silver deposit consistent with good protection under the conditions of service. A basis of comparison may be found in the present trade standards for silverware, even though some of these standards are in some instances far above the weights called for in less expensive types of work. In making comparisons, the simple yardstick is the fact that a deposit of silver weighing 20 dwt. per sq. ft. (33.5 mg. per sq. cm.) has an average thickness of about 0.00125 in. (0.032 mm.).

The various weights of the silver on silverware are as follows:

Flatware
(Per Gross of Teaspoons)

Plate	Gm.	Troy Oz.
Federal Specification (Plate about 0.00114 in. thick)	280	9
Quadruple	250	8
Triple	187	6
Double	124	4
Standard	62	2
Half	31	1

[11] *Private communication from Nathaniel Hall.*

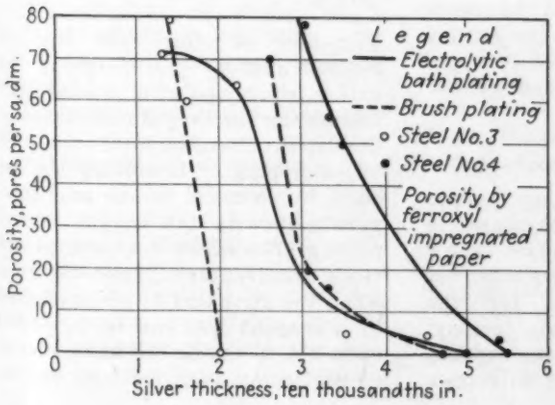


FIG. 9—The variation of porosity with base metal, plating thickness and the method of plating. Courtesy of American Electroplaters' Society.

TABLE I—Time Required for a Thickness in Inches of Silver. Calculated on the Basis of 100 Per Cent Cathode Efficiency

Current Density		Hr., Min. and Sec.																			
Amp. Per Sq. Ft.	Amp. Per Sq. In.	0.00001	0.00002	0.00003	0.00004	0.00005	0.00006	0.00007	0.00008	0.00009	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.001	0.002
0.05	0.0035	:07[20]	:15	:22	:30	:37	:44	:52	1:00	1:07	1:14	2:27	3:40	4:53	6:07	7:20	8:33	9:47	11:00	12:14	24:28
1.00	0.0070	:03[40]	:07[20]	:11	:15	:19	:22	:26	:30	:34	:37	1:14	1:50	2:27	3:04	3:40	4:17	4:54	5:30	6:07	12:14
1.50	0.0105	:02[45]	:05[30]	:08[15]	:11	:14	:17	:20	:22	:25	:28	:55	1:22	1:50	2:18	2:45	3:13	3:41	4:09	4:35	9:10
2.00	0.0140	:01[50]	:03[40]	:05[30]	:07[20]	:09[10]	:11	:13	:15	:17	:19	:37	:56	1:14	1:32	1:50	2:09	2:28	2:47	3:03	6:06
2.50	0.0175	:01[28]	:02[56]	:04[24]	:05[52]	:07[20]	:08[48]	:10[16]	:12	:13	:15	:29	:44	:59	1:14	1:28	1:43	1:58	2:13	2:27	4:54
3.00	0.0210	:01[14]	:02[27]	:03[40]	:04[53]	:06[06]	:07[20]	:08[33]	:09[47]	:11	:12	:25	:37	:49	1:01	1:14	1:26	1:48	2:00	2:02	4:04
3.50	0.0245	:01[03]	:02[06]	:03[10]	:04[12]	:05[15]	:06[18]	:07[21]	:08[24]	:09[27]	:10[30]	:21	:32	:42	:53	1:03	1:14	1:24	1:35	1:44	3:28
4.00	0.0280	:00[55]	:01[50]	:02[45]	:03[40]	:04[35]	:05[30]	:06[25]	:07[20]	:08[15]	:09[10]	:19	:28	:37	:46	:55	1:04	1:14	1:23	1:32	3:04
4.50	0.0315	:00[49]	:01[38]	:02[27]	:03[16]	:04[05]	:04[54]	:05[43]	:06[32]	:07[21]	:08[10]	:17	:25	:33	:41	:49	:57	1:06	1:14	1:22	2:44
5.00	0.0350	:00[44]	:01[28]	:02[12]	:02[56]	:03[40]	:04[24]	:05[08]	:05[52]	:06[36]	:07[20]	:15	:22	:30	:37	:44	:51	:59	1:07	1:13	2:26
5.50	0.0385	:00[40]	:01[20]	:02	:02[40]	:03[20]	:04	:04[40]	:05[20]	:06	:06[40]	:14	:20	:27	:34	:40	:47	:54	1:01	1:07	2:14
6.00	0.0420	:00[37]	:01[14]	:01[51]	:02[20]	:03[05]	:03[42]	:04[19]	:05	:05[37]	:06[14]	:13	:19	:25	:31	:37	:43	:50	:56	1:02	2:04
6.50	0.0455	:00[34]	:01[08]	:01[42]	:02[16]	:02[50]	:03[24]	:04	:04[32]	:05[06]	:05[40]	:12	:17	:23	:29	:34	:40	:46	:52	:57	1:54
7.00	0.0490	:00[32]	:01[03]	:01[34]	:02[05]	:02[37]	:03[08]	:03[40]	:04[11]	:04[42]	:05[14]	:10[28]	:16	:21	:26	:32	:37	:43	:49	:52	1:44
7.50	0.0525	:00[30]	:00[59]	:01[28]	:01[58]	:02[28]	:02[57]	:03[26]	:04	:04[30]	:05	:10	:15	:20	:25	:30	:35	:40	:45	:50	1:40
8.00	0.0560	:00[28]	:00[55]	:01[22]	:01[50]	:02[18]	:02[45]	:03[13]	:03[40]	:04[01]	:04[36]	:09[12]	:14	:18	:23	:27	:32	:37	:42	:46	1:32
8.50	0.0595	:00[26]	:00[52]	:01[18]	:01[44]	:02[10]	:02[36]	:03	:03[25]	:03[51]	:04[17]	:08[34]	:13	:17	:22	:26	:30	:34	:39	:43	1:26
9.00	0.0630	:00[25]	:00[49]	:01[13]	:01[38]	:01[52]	:02[26]	:02[50]	:03[15]	:03[40]	:04[05]	:03[10]	:12	:16	:21	:25	:29	:33	:37	:41	1:22
G. Per Square In.		0.00172	0.0035	0.0052	0.0069	0.0086	0.0103	0.0121	0.0138	0.0155	0.0172	0.0344	0.0516	0.0688	0.0861	0.1033	0.1205	0.1377	0.1550	0.1772	0.3444

Atomic Weight of Silver = 108.
Specific Gravity of Silver = 10.5
Electro-Chemical Equivalent of Silver = 0.001118
Note:—Time below 11 min. given in min. and sec.; 11 min. and above given in hr. and min.

Cutlery
(Per Doz. Knives)

Plate	Gm.	Dwt.
Hotel	31.1	20
Federal Specification (Plate about 0.00125 in. thick)	26.4	17
Heavy	24.9	16
Standard	18.7	12

Hollowware

Plate	Dwt. per Sq. Ft.	Mg. per Sq. Cm.
Federal Specification (Plate about 0.00125 in. thick)	20	33.5
Extra Heavy Hotel	15	25.1
Heavy	10	16.8
Medium	5	8.4
Light	2	3.4

The rate of deposition of silver can be calculated from the following formula:

$$T = \frac{M \times C}{10{,}000\ A}$$

where: T = thickness in in.
A = amp.-min. per sq. ft. to deposit 0.0001 in. at 99 per cent efficiency (38 for silver).
M = plating time in min.
C = cathode current density in amp. per sq. ft.

So for example, if a deposit of 0.001 in. of silver is required and the cathode current density available is 15 amp. per sq. ft., the time required may be figured from the above formula as follows:

$$M = \frac{T \times 10{,}000 \times A}{C} = \frac{0.001 \times 10{,}000 \times 38}{15} =$$

25.33 min.

Table I shows the time required for the deposit of various thicknesses of silver, in fractions of an in., calculated on the basis of 100 per cent cathode efficiency.[12] Little if any correction need be made from these figures, as the normal cathode efficiency for well operated silver solutions is around 99 per cent.

[12] *"Metal Plating," by W. G. Knox. "Metal Industry," January, 1921, p. 26.*

Testing Silver Deposits

In silver deposits that replace nickel and chromium, thickness is perhaps the most important factor but freedom from porosity must not be overlooked. Tests for the porosity of silver include ferroxyl gel which turns blue at the exposed iron spots. For plating on copper or copper alloys, the gel should contain ferricyanide as well. The hot distilled water test is useful. The degreased specimen is heated in an open glass vessel at about 200 deg. F. for three hr. and allowed to remain in the water, as it cools, for at least 18 hr. longer. Rust spots that may develop indicate pores and are easily counted.

The methods of measuring the thickness of metallic coatings may be divided into two classes: (1) Those which measure the average thickness over a given area, and (2) those that measure the thickness at a given point. These are fully described in a number of places in the plating literature.[13]

[13] *Plating and Finishing Guidebook, 1941, p. 117.*

Varieties of the first general method include: (1) Weighing the article before and after plating, and calculating the average thickness of the deposit from the total area, and, (2) stripping or dissolving the deposit by chemical means and comparing it with the weight before plating. The latter has several obvious disadvantages, however, even when the stripping is accomplished by a reagent that can be depended upon not to attack the basis metal. In particular, both methods fail to

indicate the uniformity, or lack of it, with which the deposit has been distributed.

There are several methods for measuring local thickness that are now being widely used. By cutting a cross-section of a specimen, the deposit can be actually measured by using a microscope. This is slow and calls for skilled operation. The chord method, developed by Mesle, is purely mechanical in character. The coating on a flat surface is cut with a circular grinding wheel or on a curved surface with a flat file. Necessarily the width of the cut varies with the thickness of the coating and the thickness may be calculated from the formula:

$$T = \frac{C^2}{8R}$$

Where: T = coating thickness
C = width of cut
R = radius of curvature of the wheel or plated article.

Mesle gives an interesting comparison of results by four methods of measurement' in Table II.

Defects in silver plating are varied in character. Red stains have been known to come up during the polishing operation after plating. These are often caused by the action of polishing rouge on the silver surface under the heat generated by the polishing operation. White spots may appear some time after the article has been finished, due to the inclusion in the plate of cyanides from the solution. Coarsely crystalline deposits are caused by improper composition of solution or improper temperature and current density. Peeling is likely to be due to imperfect cleaning or striking, and blistering may be caused by the absorption of atomic hydrogen by the steel during cleaning or pickling. Porosity is due to suspended matter in the solution or roughness of the basis metal. Roughness may be caused by bubbles of air in the solution, occasioned by too brisk agitation or filtration.

TABLE II

Thickness of Plate in In., as Determined by Four Different Measuring Methods

Sample	Micrometer	Current-Density Meter	Stripping Method	Chord Method
1	0.00100	0.00096	0.00085	0.00099
2	0.00120	0.00122	0.00100	0.00119
3	0.00130	.....	0.00110	0.00112
4	0.00300	.....	0.00240	0.00250
5	0.00310	.....	0.00260	0.00320

The properties called for in a good silver deposit are sufficient thickness, adherence, freedom from porosity, even distribution, and softness, to permit easy buffing to a high luster.

Acknowledgement and thanks are made to the following firms and individuals for their courtesy in supplying or permitting the use of the illustrations that accompanied this article: Silver Producers Research Project, under the supervision of Handy & Harman; DeVilbiss Co.; American Electroplaters' Society ("A Study of Silver Plating," by Dornblatt, Lowe and Simon, proceedings A.E.S. 1939); the Electrochemical Society ("Silver Plating," by Promisel and Wood, preprint 80-35, 1941); and Hanson-Van Winkle-Munning Co.

Low Speed Rotor Balancer

LOW speed machines, such as waterwheels and diesel driven generators rotating at speeds as low as 100 r.p.m., may now be dynamically balanced on their own pedestals by means of a new type pick-up developed by engineers of the Westinghouse Electric & Mfg. Co., East Pittsburgh. This new pick-up indicates vibrations of double amplitude as low as 0.003 in., and the lower limit of its field of use is 100 r.p.m., compared to the limit of 600 r.p.m., with pick-ups now in use. The newly developed pick-up is used with a standard portable balancing unit and the conventional sine-wave generator.

The difficulty with low speed balancing, heretofore, has been that a pick-up capable of measuring vibrations of low frequencies must have much lower natural frequencies than the vibrations measured, To furnish correct indication, a vibration pick-up and its mounting should have a natural frequency of no more than one-half the frequency of vibration of the machine to be balanced. Thus for a 100 r.p.m. generator, for example, the natural frequency of the pick-up must be not more than 50 cycles per min. To get a body with such a low frequency used to entail the use of large masses, making the instrument unwieldy.

The new pick-up employs something like an inverted pendulum. The frequency of an ordinary pendulum, operated by gravity, can be lowered by lengthening its arm. Similarly, the natural frequency of an inverted pendulum can be made extremely low by weakening the restoring springs so that it is barely stable in a vertical position. To permit the use of this pick-up in all directions, the effect of gravity has been eliminated by laying the pendulum on its side, and the force previously supplied by gravity is furnished by a toggle-like spring mechanism attached to the pendulum.

o o o



THIS device, developed by Westinghouse engineers, is a vibration pick-up for balancing low speed rotors. Dynamic balancing, heretofore, has been limited to machines rotating above 600 r.p.m., but can now be applied to machines rotating as slowly as 100 r.p.m. This new pick-up can indicate vibrations of double amplitude as low as 0.003 in. at 100 r.p.m.

New Miller Speeds Plane Production

A HIGH cycle profile extrusion milling machine for milling the large extruded aluminum alloy shapes used in making the main beam and similar parts of the "Lightning" P-38 interceptor plane is now in use at Plant No. 2 of the Lockheed Aircraft Corp., Los Angeles.

Designed by Rudolph Onsrud in collaboration with Lockheed engineers and built at the Onsrud Machine Works, Chicago, this profile miller is the first of its kind known to be used in the aircraft industry, and speeds up plane production considerably. The 10 extrusions necessary for each plane are milled in 2 hr., 20 min., as compared to the former milling time of 90 hr., saving 87 2/3 hr., or about 3½ days production time per plane.

Milling long extrusions on tapers with cut-outs in their flanges and various other cuts for reducing weight have been quite a problem to aircraft manufacturers. Due to their length and awkwardness in handling, it is difficult to put these extruded shapes on conventional machines, laying out each individual part. The Onsrud extrusion miller, 30 ft. long, has a cutting area 12 in. wide and 20 ft. long, cutting in both vertical and horizontal planes. The carriage travels on ways by means of a rack and gear arrangement, and has a feed range from 3 to 18 ft. per min. in either direction.

The platform upon which the operator stands is 15 in. off the floor and fastened to the back of the carriage, the operator riding the carriage the full length of the extrusion in the mill as the carriage shuttles back and forth. Two helpers on the floor feed stock into the machine and keep the chips cleared away. The control panel for the motors and air cylinders is within easy reach of the operator.

For shaping the rough channels, there is a steel fixture with a template or former bar attached, secured to the table by bolts. Channel extrusions are placed in this fixture and held by air clamps, of which there are 26, and the clamping and unclamping is effected by depressing push-buttons which control solenoid switches that actuate the clamp cylinder valves. Three cutting heads are used, one with a horizontal spindle driven by a 15 hp. motor at 5400 r.p.m., and two vertical spindles each driven by 15-hp. motors at 10,800 r.p.m. These cutting heads are mounted on short arms that permit them to swivel to take care of in-and-out cutting conditions and the carriage feeds them along the stationary work table.

Cuts are controlled by the templates clamped to the front and back of the table. These templates have profile edges in horizontal and vertical planes, and rollers, mounted on the cutter heads, ride on the profile causing the head to move in and out. These rollers are kept in contact with the profile by air actuated pistons.

After lining up the cutters so a true duplication will be maintained in the finished part, the cutter motors are started and the cutters are lowered by air cylinders to the templates and the feed motor is engaged. Feed is automatically controlled, getting maximum efficiency without overload, and cuts as deep as ¾ in. are made. One vertical head cuts side cut-outs by means of a cam secured to the template and the other vertical head travels by a cam roller from the same template that guides the horizontal head.

One of the interesting features of this machine is that soluble oil is used not only as a coolant for the cutters and work but to cool the motors as well, being first pumped through the motor water jackets before being directed on the cutters. Because of the high surface speeds involved, what amounts to a grinding compound is used, with a wetting agent added to let the oil penetrate to the chip fracture. The motors operate on high frequency current.

An air compressor, mounted on the carriage and also cooled by soluble oil, supplies air for the follower control cylinders and also for the pneumatically operated Reeves drive on the carriage feed. In motion the carriage trips a bell crank that in turn actuates the air cylinders on the Reeves drive, slowing or speeding the carriage feed. The cutter motors are reversible, allow-

SETTING a 20-ft. dural channel, for the center section of the main beam of the Lockheed P-38 interceptor plane, into the Onsrud extrusion miller. After milling, this channel will be slightly bent in the middle in a hydraulic press and then placed in a jig as the first operation in the assembly of the P-38.

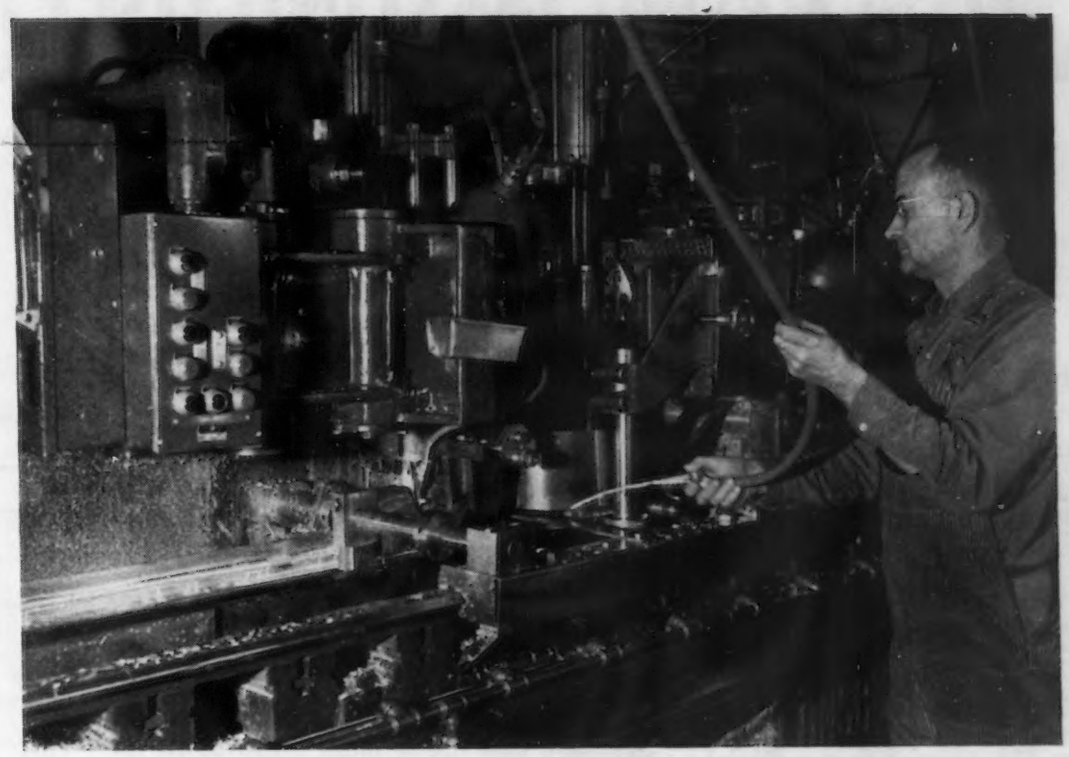


o o o

AT RIGHT

THE carriage, with three cutting heads, moves along the channel, milling it both vertically and horizontally to the shape of a template channel. The operator rides the carriage, while assistants feed extrusions into the machine and keep chips cleared away.

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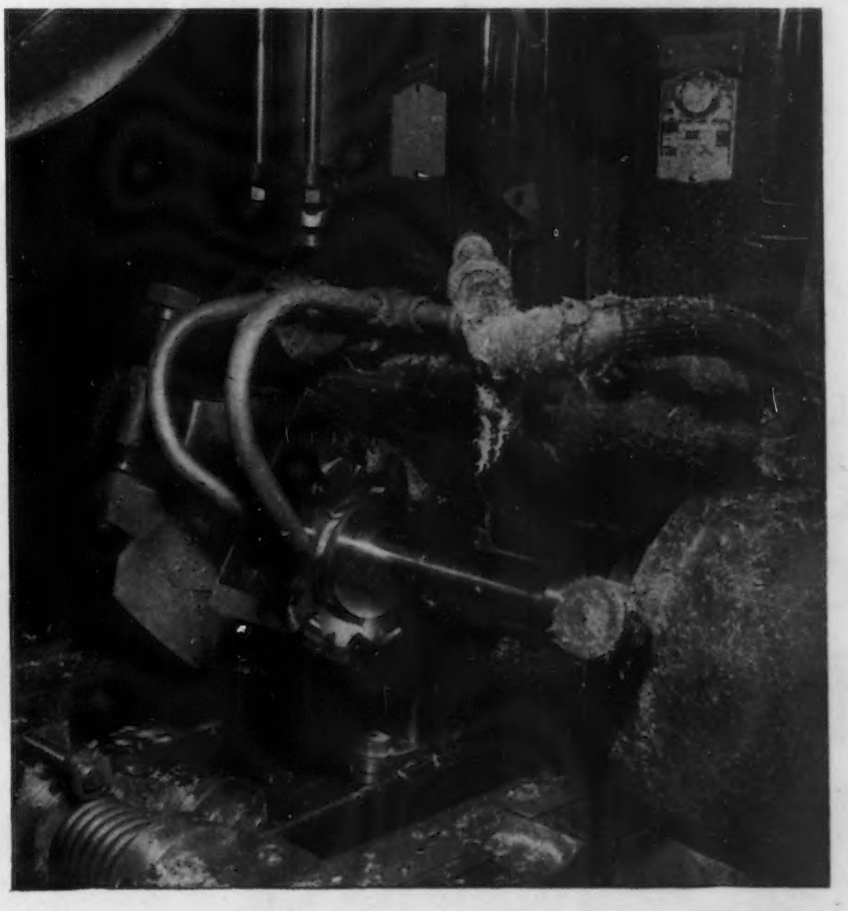
ing for climbing or backing out with either right or left hand cutters.

On other parts to be milled, where it is not practical to clamp with air, a roller carriage is used, traveling on rails attached to the table top. This roller carriage, fastened to the machine carriage, is spring-tensioned both vertically and horizontally, holding the part uniformly and securely.

Carbide tipped cutters are used exclusively on this machine, giving upward of 300 per cent better life between grinds, better finish, and less down-time on the machine. Because of the weight of the miller, 26,000 lb., and its accuracy, Lockheed can hold to very close tolerances for this type of work. Upon completion of the P-38 contract, the company plans to put different types of machining on this versatile machine.

The work now being done on the Onsrud profile extrusion miller includes one upper and one lower channel for the center section of the 20 ft. main beam of the P-38. Other operations include the milling of four left and four right cap strips, which are extensions of the channels into the wings. These cap strips are 8 and 10 ft. long. This miller has never been tested to its maximum cutting capacity, but 42 cu. in. of dural have been removed per min.

CARBIDE tipped cutters, as shown here, are used exclusively on the Onsrud extrusion miller, giving up to 300 per cent better life between grinds, better finish and less idle machine time. Soluble oil lubricates the cutters as well as cools the cutters and the work, and compressed air keeps the chips cleared away as the machine cuts its way through the 20-ft. dural channel.



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Jones & Lamson 16″ Fay Automatic Lathe tooled to machine a shell.

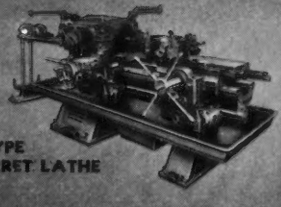
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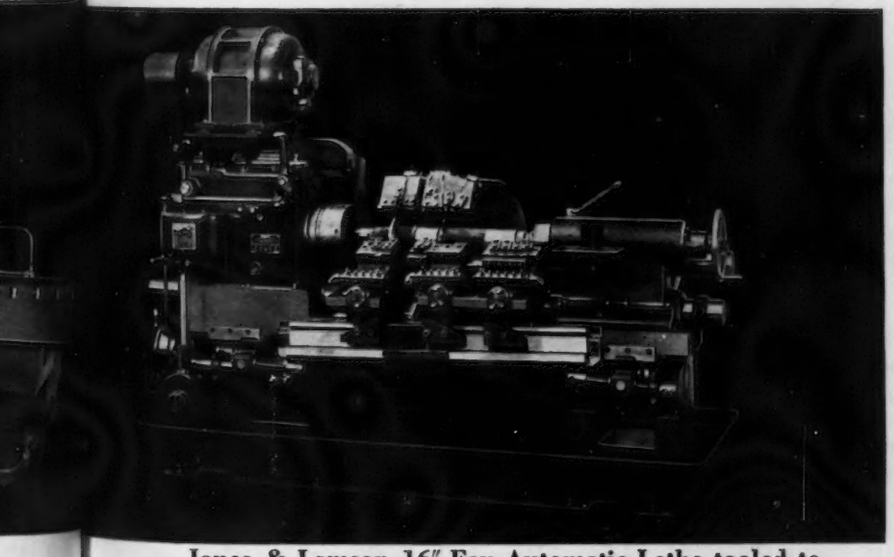
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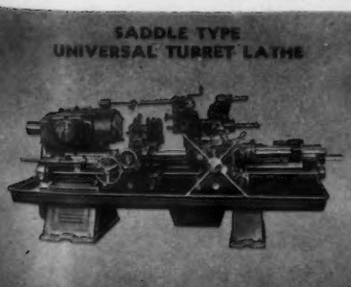
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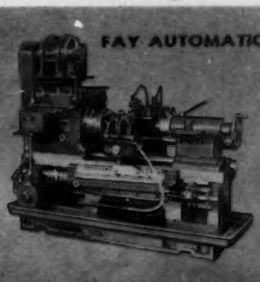
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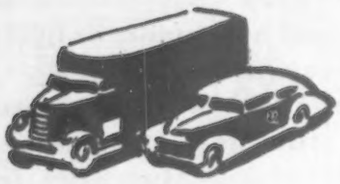




PROFIT PRODUCING
MACHINE TOOLS

Assembly Line.

• Union coup to set up industrial council for controlling auto industry in wartime seen as attempt at socialization . . . New drive expected when labor leaders have time to reorganize their lines.



DETROIT—It is unfortunately true that a majority of Americans do not know the full facts of what went on in Washington during the past week when the UAW-CIO was attempting its coup to put the automobile industry under the domination of an industrial "council." They do not yet believe that the tricky effort to win for labor a "voice" in industrial management was very nearly a successful maneuvering of government and industry into the step of nationalizing or socializing wartime production.

It is not yet realized by many that for a short time during the week of Jan. 5, an industry planning board was in existence which came pretty close to meeting the specifications of the plan fathered by Walter Reuther, product of a Communist labor school. Or that the rejection of the particular setup came not because of industry's objections, but because the UAW itself—and Reuther—demanded a broadening of powers and a more complete implementation of the council plan to give it final and absolute control over the industry. Because the Labor - Management-Government Board did not get the final power to "determine and put into effect" (later changed by UAW to "determine and make effective") but was offered a planning and "recommending" authority only, UAW flatly rejected its gains. Instead it is now going ahead with a propaganda campaign, and sending Reuther on an Army - conducted tour of war plants, and will come back shortly with what it hopes will be a telling, conclusive blow against industry.

THE abortive coup of early last week will be followed by still another, just as soon as the union group has mustered its forces, had time to exert new political pressures (which undoubtedly preceded its foray last week), and again finds an opening which its opportunist leaders can attempt to breech. The biggest showdown of all time between labor and management is not far off. It will be the most important single development in the industry-labor picture since the passage of the Wagner Act.

These may be looked back upon by historians of some later date as attempts at social and economic revolution, yet, curiously enough, most Americans—and syndicated newspaper columnists who are writing to them—do not seem to know just what the Reuther plan itself is. Nor do they have much first-hand information about the Murray plan, which the Reuther plan is designed to implement and install in American industry. Nor do they realize that the Reuther plan itself wasn't formally proposed for adoption last week—just an innocuous-sounding war-production committee is "on the record."

Most of the people who are currently whooping it up for the Reuther plan haven't even read it and admit they don't understand it. C. E. Wilson, president of General Motors, asked for a show of hands on that question at a press conference last week, and the truth of the above statement was made clear. The general public knowledge of the Reuther plan has been culled only from newspaper publicity given to the plan when it was announced, and the virtues claimed at that time for the plan by the union are being repeated again now, and are unchallenged.

Industry, specifically the automotive industry, is to blame for this lack of knowledge of what the Reuther plan really means. The industry alone possesses the exact answer to Walter Reuther and the UAW on this issue, but for more than a year it has neglected to answer Reuther's claims or take issue with them. Attempts are being made now to present facts and figures and to cite examples. But at least one such attempt last week here in Detroit was promptly squelched by an Army censor.

A YEAR ago, the industry's leaders just wouldn't take the plan seriously. Involved in the beginnings of the auto-aviation program and other defense problems, they thought that their efforts would speak for themselves, and that the fantastic proposal for a CIO committee to run the program was just publicity cooked up for Reuther to win him a position in OPM or help him win deferment by his draft board. They thought the issue would die because it was —clearly, to auto production men— a silly, vapid plan. Ignore it, and let it die, they said.

Industry had done that same thing before in similar circumstances, they argued, so why not now?

But the issue was never dead, only dormant. It was dormant only because the UAW was waiting for the time when its opportunists could seize the ball, and again run with it. Those have been CIO tactics right along, and the Murray plan was long ago chalked up as a primary goal to be gained. Meanwhile there was insistent UAW criticism against the way the arms program was being carried out by the auto industry. For the most part these criticisms went unanswered by the industry, sometimes because it was forced to comply with Army and Navy secrecy requirements and could not, therefore, reveal data that would be a complete answer. Mostly, however, it chose not to answer, preferring to ignore attacks.

During the period of silence from the industry, the UAW skillfully propagandized, thriving on the fact that it was unanswered. Repeatedly in these pages, the case was summarized, giving facts that are apparent in daily rounds of the industry, trying to explain and clarify, hoping that bringing the issue into the open would hasten a final settlement and avert the



THE Main Head and Side Head of this Bullard Vertical Turret Lathe are cutting simultaneously—with consequent saving in time. With five positions for tooling on the main turret head, four tools on the side head, nine different operations at one chucking are possible.

Add the sturdiness and sustained accuracy for which the V.T.L. is famous and you've got some of the reasons why it's the greatest machine tool of its type in the world.

Bullard V.T.L.s have *all* these features

Vertical Design • Rigidity and Power for Carbide Tools • 5-Face Turret on Main Head • Rapid Power Traverse of Main Head • 4-Tool Turret on Side Head • Simultaneous and Independent Head Action • Centralized Control

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

chance that revolutionaries would have their way.

Yet on Jan. 6, for a few hours, it looked as though industry had lost its battle. When Army and Navy officials left that meeting in Washington late Tuesday, it seemed that the joint Labor-Government-Management committee had already been set up. Newspaper stories all over the nation conceded that "the Reuther plan, tossed aside for a year, now has been accepted."

That the UAW coup did not finally succeed is due, in large measure, to the fact that the industry decided in advance of the Washington sessions, to make a last-ditch fight of it. The attitude of executives changed almost overnight on this subject when they became aware that the CIO leaders were looking on the meeting call as a golden opportunity for them to put the plan across. (Previously, UAW had been aiming its sights on the period around March 1, when unemployment due to auto curtailment was expected to be at its worst. See page 120, Dec. 4, 1941.) Full page UAW ads in New York and Washington papers gave the cue, and the industry's leaders, finally aroused and awake to the ugly possibilities, replied with full-page ads in Detroit and Washington papers on Jan. 5, the day the sessions were to convene.

AND why were the issues fought out in full page ads? No one commits himself on this for publication, but there are angles to it that deserve at least speculation. First, of all, industrialists have complained that they sometimes are given no chance to express their views or even to present facts when they are called in to attend Washington meetings. Called in as expert advisers, they have frequently walked out with another edict ringing in their ears. Second, an unfortunate fact is that most of these meetings are "closed sessions," which the industry's leaders respected as confidential—only to see later that a one-sided version of the story made its appearance. The ads appear to have been attempts to "get on record" before another "closed" meeting was staged.

There have been plenty of "leaks" to disclose what happened at these particular sessions. On Monday, for instance, conversations were general, and dealt with war production, auto production, and new war goods. As the session was concluded, OPM named a *five-man* industry committee and told it to meet the next morning with a *five-man* labor committee. "What for? You'll find out tomorrow," the industrialists were told. But early morning editions of Tuesday's papers said that there would be *one* committee of 10 men, with a government representation besides. And Tuesday evening, it was the announcement of that 10-man committee that brought the issue to a head, precipitated the UAW objection to the word "recommend" and, for the time being, blew up the program. That committee, announced in newspapers, later was dissolved, and a new seven-man *advisory* committee named in its place.

IT is suspected that the word "recommend" was a compromise selected by Hillman and Knudsen, in hopes that it would satisfy everybody, but no one seems to know at present. There is speculation in Detroit, asking why the UAW—able to sell the plan pretty generally in government circles, it appears—was not able to get its choice of words in the original draft of the committee announcement but, instead, had to fight for them—unsuccessfully.

The industry's full and conclusive reply to the Reuther plan still is not a matter of record. There have been partial answers, and the industry's ad was a concise summing up of some of the arguments. But Reuther's appeal with the lay public is in a grandiose assumption on his part that he knows more of the know-how of mass production than is in the ken of the men who babied the auto industry when it was wearing straight fenders and brass radiators and built it into the largest producing unit in the world. Those men must set about to PROVE Reuther wrong, we believe, in order to upset him from his temporary position as a sort of demi-god to the science of mass production.

Open, public discussion of the Reuther and Murray plans will be necessary to give the public enough facts to judge whether they deserve any backing. The industry has acknowledged the attack and challenge that "impugns our integrity, our ability, our loyalty to our Country." It also says in its first reply to Reuther and the UAW: "We can take it, and rest our case on the quality and the volume of war materials our plants are now turning out. (Editor's note: Attempts to use these facts have met with censorship, of course.) But the attacks on this industry's war work constitute a gross attempt to deceive the American people—raising false hopes and expectations. Above all, they are designed to create division so that certain groups may obtain control of the productive machinery of the United States."

Other parts of the industry's statement read: "Call them by any name you will, the plans of certain labor leaders constitute a design to transfer management of the automotive industry from the men who know how to make things, to those who have no training or qualifications for responsibility.

"The men who led the original sitdown strikes, who tolerated and encouraged not scores but hundreds of sitdowns, slowdowns and other forms of production sabotage, now propose that they are the capable ones to guide the greatest single, behind-the-lines responsibility—production for war."

R. Nugent to Develop Auto Rationing Plans

Washington

• • • Rolf Nugent, consumer credit consultant in the Office of Price Administration, has been appointed associate price executive in the automobile and truck section and will develop the automobile rationing program, J. K. Galbraith, assistant administrator, announced. Mr. Nugent will be associated in his new work with Cyrus McCormick, price executive of the automobile and truck section. He worked with Leon Henderson for Pennsylvania at Harrisburg in the early '20's, became Mr. Henderson's assistant when the latter was appointed director of the Department of Consumer Credit Studies for the Russell Sage Foundation, and succeeded to that position when Henderson entered government service in 1934.



Discoveries...

while Building for Victory

Finer Metal Fabrication for the Products of Tomorrow... through Van Dorn Research

Right now, every industry must be on the alert. For out of arms production is coming an abundance of discoveries in new metals and fabricating processes. They're building for Victory today. But tomorrow, they'll serve a new era in peacetime production.

Today's high-speed, highly-developed processes of building faster planes, sturdier ships and more powerful tanks and guns will be the accepted methods of producing better automobiles, stoves, machinery and other products for tomorrow. This transition is already under way. Keep up with it.

Van Dorn—master of metal fabrication for 64 years—has a vast research organization at work investigating war-time manufacturing discoveries to the limits of their peacetime possibilities. Analyzing new metals, experimenting with new processes of welding, heat treating and machining, devising new principles of design—all important factors in product development plans.

Take advantage of Van Dorn's broad metal fabricating research work now. Without cost or obligation, Van Dorn engineers will work for you. Call them in for discussion. Write, wire or phone.

THE VAN DORN IRON WORKS COMPANY

2685 EAST 79th STREET • CLEVELAND, OHIO

THE LARGEST JAIL BUILDERS IN AMERICA

Washington . . .

• Biggest immediate problem in connection with huge new war program promises to revolve around special steels needed for planes, tanks and anti-aircraft guns . . . Some special ores shut off by war conditions.

WASHINGTON — OPM officials and industrialists alike say that, as enormous as they are, the armament requirements fixed by President Roosevelt will be supplied. It is thoroughly realized that it will demand great quantities of materials, toil and sweat, and that never before has it been so essential for labor and management to pull together.

Taking alone the gigantic 1942 production figures, which are greatly overshadowed by those set for 1943, it is readily seen that the military machine has to be greatly built up and geared to topmost efforts, calling for a 7-day week round-the-clock work and a struggle to get raw materials. It is going to take all this to turn out 60,000 planes, 45,000 tanks, 20,000 anti-aircraft guns and 8,000,000 deadweight tons of ships.

Civilian sacrifices by way of being denied materials hardly have started.

THE chief burden of the program is going to be placed on the iron and steel and metalworking industries and shipyards. They are heading toward a practically complete arsenal. Tremendous industries—the automotive industry being the greatest example—are to be converted to the vast job of producing the "end products," such as airplanes and tanks, of the arsenal and will be fed by the steel industry, foundries, parts makers and a multitude of other sources.

In steel, the large scale war production program announced by the President for both 1942 and 1943 affects mostly vitally special steels, alloy material for armor plate, forgings, parts, and so on, some of a heavy and some of a light character, for tanks, airplanes and anti-aircraft guns. The chief large volume carbon steel requirement will be for steel for ships and it is estimated that the 8,000,000 tons asked for will take about 2,800,000 tons of steel of which about 2,000,000 tons will be plates.

IT IS the special steel supply that promises to be the larger immediate problem. It is not only a matter of providing increased electric furnace capacity. It is a matter of getting the special ores, most of which are imported and some of which have been shut off by war conditions.

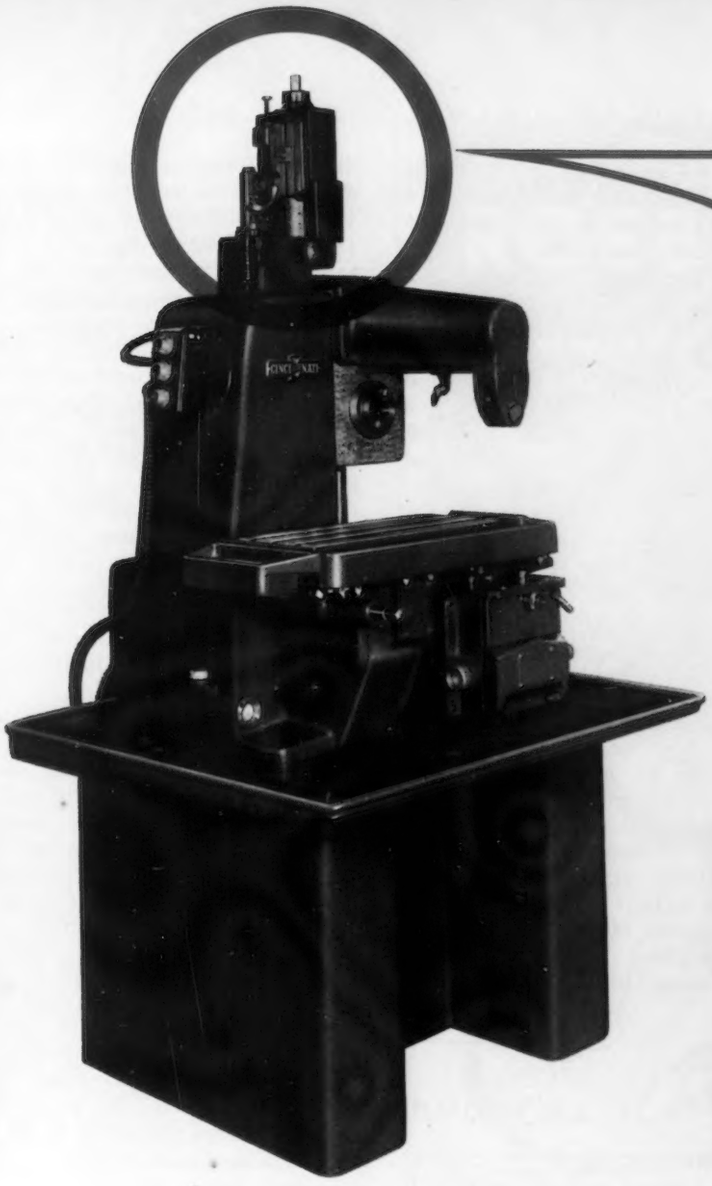
OPM has been doing considerable work to meet these shortages but now its efforts will have to be intensified. Its effort partially offsets the shortages, but it will have to be more drastic. Cutting out passenger car and light truck production, especially the former, will divert alloy material to the war machine. So will the curtailment or elimination of numerous other civilian lines. This cutting process has been particularly noticeable since Pearl Harbor. While some of the individual units affected are not large steel users, when combined, the tonnage, some of it alloy material, mounts up importantly.

It is interesting to note some of these curtailment activities recently ordered by OPM. It ordered a slash of 25 to 40 per cent in the first quarter production of vacuum cleaners. It has sharply curtailed the use of critical materials for the manufacture of vending machines, prohibiting entirely after Feb. 1, the use of aluminum, stainless steel, chromium, copper, lead, nickel, tin and copper base alloys. The use of zinc will be cut 50 per cent in January and 75 per cent thereafter. A recent order provides that no deliveries of copper or brass scrap may be made except to a scrap dealer or, in the case of brass mill scrap to a brass mill, except upon specific authorization of the Director of Priorities. A conservation order bars generally manufacturers of radios from using copper or copper base alloy except to the extent necessary for carrying electrical current, and all dec-

AIR MEN MEET: Air Chief Marshal, Sir Charles Portal, of the RAF, and Lt. Gen. Henry H. Arnold, Chief of the U. S. Air Forces, met in Washington to discuss aerial details of the Grand Allied Strategy.

INS Photo

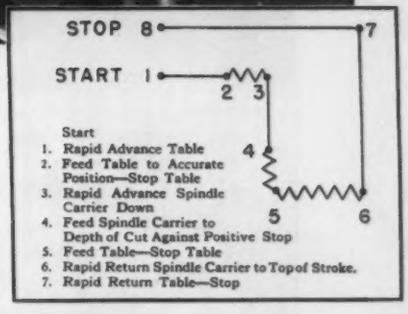




IT TAKES THE OBSTRUCTION JUMPS *Automatically*







The illustration above, with the explanatory cycle diagram, shows a typical example of the type of job handled on the CINCINNATI 0-8 Plain Automatic Miller with Automatic Rise and Fall Spindle Carrier.

AN obstruction in the path of a milling cut brings these time-consuming manipulations to mind: Adjust table—raise knee to depth of cut—(mill)—lower knee—rapid traverse table to clear work of cutter. The CINCINNATI 0-8 Plain Automatic Miller, equipped with Automatic Rise and Fall Spindle Carrier, does all these things *automatically; quickly;* far more *accurately* than can be done by hand adjustments of the work to the cutter.

The 0-8 qualifications of closer accuracy and higher production than ever before, fit admirably into the production of the many intricate mechanisms required for both peace-time and war-time equipment. Brief specifications will be found in Sweet's Catalog File. More complete information may be obtained by writing to us for catalog M-964.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

orative uses of copper were prohibited. Production in important lines is coming under a broadened simplification program.

SUBSTITUTES are being used and specifications are being changed. These two moves apparently are going to have to be considerably stimulated with respect to the use of alloy ores, both because of the heavy requirements for alloy steel under the big aircraft-tank program and by reason of the fact that imports are cut down or entirely shut off temporarily. The government did not do nearly as good a job as it should have done in stocking these critical materials and one prospective result will be the use of lower alloy content.

The picture for seven alloy elements for 1942 was painted by Dr. George B. Waterhouse of OPM's Iron and Steel Branch at its 1941 Armistice Day meeting with the steel industry. It was not a bright picture and it is blacker today than ever before, making conservation, substitution, curtailment and other measures all the more necessary to supply defense needs. For some of the expected imports will not be forthcoming, while requirements have greatly increased.

MANGANESE—Studies disclose that present world production now is 1,800,000 tons annually, that the United States consumed 1,200,000 tons in 1941, and that an estimated 1,300,000 tons will be needed and consumed in 1942. Supplies cut off from the Philippines are expected to be made up by greater production from South America, now the principal source of supply.

NICKEL—Latest nickel figures show only 200,000,000 lb. of cathode nickel available for all uses, with only about 124,000,000 lb. being allotted for steelmaking, not counting recoveries from scrap. The remainder, not including scrap sources, is to be used for non-ferrous purposes, such as condenser tubes, etc. Specifications must be changed to make existing supplies adequate for defense needs.

CHROME ORE—Officials say that the Axis is now in control of approximately 60 per cent of chromium sources, with the United States being cut off from Turkey and the Philippines. Philippine mines were to have been developed to produce 300,000 tons of ore in 1942. New Caledonian supplies are said not to be safe, and Turkish supplies, though nominally not Axis controlled, are endangered by the difficulty of getting ships through the Suez and across the Indian Ocean. For this reason, small supplies formerly obtained from India are similarly endangered.

United States supplies are not limited to the Union of South Africa, Southern Rhodesia, Cuba and other parts of Africa, but the previous figure of 900,000 tons is still expected to be imported with the increase in productivity in these sources.

Metallurgical ores to be allotted for the over-all war and essential civilian program will be about 430,000 tons in 1942, and out of this will be secured only 144,000 tons of ferrochrome to be produced and allotted for 1942. Larger stores in government hands to be used as a cushion are being conserved, and it is expected that any chemical chrome, or chromium oxide procured will be used along with the metallurgical ores. This means that civilian industries requiring chrome for stainless steels, and pigments, such as the paint and shoe industries are going to be required to seek substitutes.

VANADIUM—The most crucial point in alloy steels is vanadium supply. Statistics show a need for vanadium of about 6,375,000 lb., with only 4,612,500 lb. domestically produced available for 1942. This means a cut in specifications. Lack in supply is attributed to scarcity of ores, and not to shipping difficulties.

MOLYBDENUM—This metal is frequently substituted for chrome and nickel and supplies are considered to be in fair shape, with 45,000,000 lb. of contained metal needed, compared with a production of 52,000,000 lb. available for 1942.

TUNGSTEN—The 1942 picture remains largely unchanged from the November estimates made by OPM, namely a supply of 22,000 tons, an estimated consumption of 21,000 tons. While Chinese imports may be slow, newly discovered and developed supplies of rich ores in Idaho will tend to off-set losses.

THE BULL OF THE WOODS — BY J. R. WILLIAMS



South American sources from which is obtained nearly 40 per cent of imports are expected to be increased in productive capacity.

Finishes Industry Gets 3 Small Business Committees

Washington

• • • **Three sub-committees** to consider small business's problems have been appointed by M. Rea Paul, acting chairman of OPM's Industrial Finishes Sub-Committee of the Protective and Technical Coatings Industry Advisory Committee.

This committee will recommend a questionnaire to be used by the group in the future: D. M. Gray, Pittsburgh; H. E. Lackey, Wilmington, Del.; Henry A. Gardner, Washington.

This group will recommend an accounting procedure for cost determination: W. R. Seitlein, Cleveland; Fred Praegner, Newark; Otto Steeger, New York.

This committee will study structural, marine and cellulose finishes, and plans for distributing defense business: Leon Roon, Elizabeth, N. J.; Ernest Trigg, Washington; Charles Reid, Cleveland; Dr. N. E. Van Stone, Cleveland; Benjamin Patterson, New York; and Frank Sulzberger, Chicago.

OPM Cuts Use of Metals For Vending Machines

Washington

• • • **OPM Priority** Director Donald M. Nelson has ordered a sharp curtailment in the use of critical materials for making vending machines. United States postage stamp machines and automats are not affected by the order, which became effective Jan. 1 and covers January and February production.

Materials whose use is curtailed are iron and steel, zinc and alnico magnets (slug-rejector mechanism), and those whose use is prohibited are aluminum, stainless steel, chromium, copper, lead, nickel, tin, and copper base alloys. It is estimated that the program will save between 5000 and 10,000 tons of steel annually and between 500 and 750 tons of zinc. The industry, largely concentrated in the Chicago area, employs approximately 3000 workers.



ROUND HIGH AND LOW CARBON COMMON AND SPECIALTY WIRES

Hard Drawn, Soft Annealed or Tempered, in all Finishes—Bright, liquor Finish, Coppered, Tinned, Galvanized.

FLAT HIGH AND LOW CARBON AND SPECIALTY WIRES

Hard Rolled, Annealed, Scaleless Tempered; Tempered and Polished, Tempered, Polished and Colored; Various Finishes—Bright, Tinned, Coppered, Hot or Electro Galvanized.

SHAPED WIRES

Various High or Low Carbon Shaped Wires such as: Shaft Casing Wires, I Beam Sections, Space Block Wires, Square, Keystone, Oval, Half Oval, Half Round, etc.

JAR ROEBLING

Here's a strip steel that must withstand real punishment—constant yanking, coiling, tangling, bending! It's a cold-rolled high carbon flat, tempered, polished, and blued—an excellent example of our ability to meet *extremely exacting* specifications.

This fine spring steel—also available tempered and polished—has great toughness and resiliency, high tensile strength, and uniform temper held within very close limits. It is also very accurate dimensionally and notably free of defects on the surface and edges.

Bring your difficult wire problems to us. We have the specialized experience and the trained organization to handle them. Your inquiry would be welcomed.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches in Principal Cities

WEST COAST . . .

• With industrial stampede partly diverted to Southern California, so that "defense layer cake has been cut horizontally." Bonneville slashes power rates and adopts provision aiding new industries.



SAN FRANCISCO — Secretary of the Interior Harold Ickes never has contended that competition with public power projects by private utilities companies is exactly moral and has been quick to take steps to see that few consumers' dollars are grabbed by the power moguls. Usually the menace of private power to society has been combated by the simple expedient of cutting rates on communal kilowatts when private competition was nearby. Bonneville Power Administration, which operates Bonneville and Grand Coulee Dam, has taken particular pride in pointing out the lower rates on publicly generated power sold to rural electric cooperatives, villages, and as many larger communities as could be induced to buy.

While thus engaged in evangelizing the merits of public power among the communities, Bonneville Administrator Paul J. Raver recognized that the low power rates he offered were a powerful magnet to electro metallurgical industries, particularly aluminum.

First, Aluminum Co. of America built a big plant at Vancouver, Wash. Then, the Reynolds Metals Co. pleased Secretary Ickes by building a plant at nearby Longview to furnish Alcoa competition. Smaller industries, notably Ohio Ferro-Alloys Corp. and Electro Metallurgical Corp., became Bonneville's customers. Finally, when it became apparent that war would become America's major industry in 1942, a number of government-owned aluminum plants, lured by cheap power, espoused the Bonneville gospel.

WHILE the Bonneville welcoming committee was spreading its arms to welcome the newcomers, firm in the belief that its lodestone of cheap power was irresistible, southern California recovered from its stunned amazement that any new industry coming to the Coast would locate elsewhere than in its sunny clime. Los Angeles boosters found that it would take an act of Congress to lower the already low rates for power from Boulder Dam. Obtaining an act of Congress is no barrier to a southern Californian bent on civic gross. By the Boulder Power Adjustment Act, passed in 1940, negotiations were conducted which brought Boulder Dam rates from 1.63 mills per hour for firm energy and .50 mills per kilowatt hour for secondary energy to 1.163 mills per kilowatt hour for firm and .34 mills per kilowatt hour for secondary energy. These rates are for falling water only and operating expenses, amortization and power transmission must be borne by distributing agencies, making the consumers' cost considerably higher, but still cheap power.

Just as expected, the industrial stampede toward Bonneville partially was diverted to southern California. First came expansion of existing industries, then a fully integrated aluminum industry comprising several plants. The biggest prize of all, the 63-million dollar reduction plant of Basic Magnesium, Inc., located near Las Vegas, Nev., close to ore deposits and not far from Boulder Dam. Probably the ore deposits had as much to do with choice of this location as did the cheap power, but evidently both Bonneville and Los Angeles regarded this plant as a great victory for southern California. (Note: Southern Nevada is recognized as part of the Los Angeles industrial area by all but the most hide bound geographers.)

Ivan Bloch, chief of the market development section of the Bonneville Power Administration fretted publicly, "Without wishing to draw odious comparisons it now appears that the defense layer cake has been cut horizontally — and the Northwest has been allocated part of one layer—the part furtherest from the frosting. . . . It is hard to understand that the almost constant disregard of the diverse contributions which are being offered by this region through its business and civic leaders, its state and federal government representatives, and its responsible technical men."

BONNEVILLE did more than fume. If cheap power was what industry and the Defense Plant Corp. wanted, it would show them some really cheap power. And so, since no fair trade acts governed the pricing of public power, Bonneville rates were slashed on New Year's Eve. The optional wholesale power rate is revised so that all kilowatt hours purchased in excess of 50 per cent load factor are billed at one mill per kilowatt hour in place of the former rate of two and one-half mills. Cost of power up to 50 per cent load factor remains the same.

A new provision added to the schedules affecting new industries provides that the billing demand for the first six months of operation will be established on a daily basis. This permits such industrial plants to experiment with new electrical processes without penalty for fluctuation in load during the initial six months of operation.

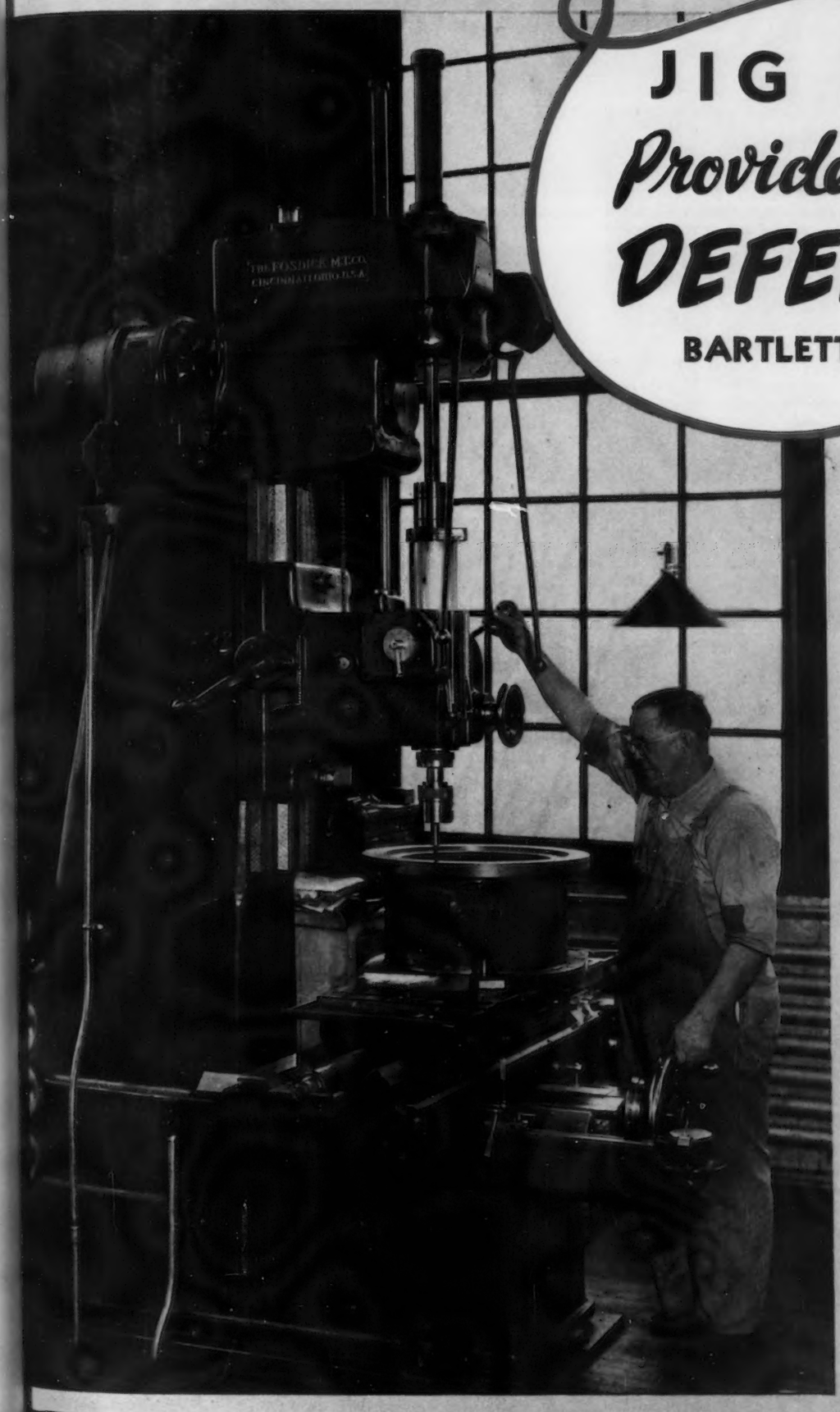
Thus Bonneville hopes to attract industries producing zinc, brass, steel, particularly the alloys, magnesium, chlorine and its derivatives, nitrates, including munitions, and phosphorous and its derivatives, to mention a few.

However cheap power gets on the Pacific Coast, it has long been recognized that industrial growth of all kinds in this section necessitates training, almost from the ground up, of an industrial labor supply. Aircraft and shipyard workers, in particular, in the skilled classifications, have nearly all had to be trained because no parallel industries existed here from which they could be drawn.

A YEAR ago it was freely predicted that an acute shortage of skilled shipyard workers would exist, particularly in the San Francisco Bay area, before the end of

(CONTINUED ON PAGE 94)

FOSDICK



JIG BORER *Provides Jigs for* DEFENSE *at*

BARTLETT HAYWARD

• The flexibility of the Fosdick Jig Borer recommends it for use in tool rooms as for example on the job illustrated, the machine is drilling a fixture to be used in the production of parts for anti-aircraft gun carriages.

From the standpoint of accuracy — speed and ease of operation — the Fosdick Jig Borer fills the need for a versatile machine capable of the close tolerances required in jig and fixture work. It may also be used to advantage for short runs on production work producing a wide variety of parts without the use of expensive jigs and fixtures.

•

Built in two sizes the 30 and 30A.

Write for Bulletin J.B.A. Jig Borer for complete details.

•

FOSDICK MACHINE TOOL COMPANY
CINCINNATI • • • OHIO

Fatigue Cracks BY A. H. DIX

Night Boating and Nitriding

• • • At this time of the year we like to hoist our bunions to the top of our mahogany desk, whose scratches show it was born a golden oak blonde, finger our bald spot, gloat over the year's touchdowns and grieve over the uncompleted passes.

From the viewpoint of the brass hats it was a satisfactory year. So generous was the industry that despite the blacking out of a great gob of our foreign circulation, the family climbed to an all-time high, with 5,942 coming in and 4,986 going out, raising our ceiling almost 1,000. No less kind were our advertisers, who used 5,360 pages in 1941 as against 4,344 in 1940, a gain of more than 1,000.

This page, we are happy to say, held its own, ending the year with its army of eighteen loyal readers still intact. On the whole it was a placid year for us, marred only by a letter of cancellation from a midwestern subscriber who objected to our spelling *hell* right out, but who returned to the fold when we promised to spell it h—ll hereafter.

With few exceptions we were able to work in the contributions sent in by loving friends. One of those for which we are still trying to find a spot is B. L. Herman's account of what happened on the Albany night boat to Charles Dickens, who used to be with our sister journal, the *Boot & Shoe Recorder*, and Walter Scott, who is still with it.

Nor have we been able to ease in the story sent in by Ben Corrado of the brains department about what the young lady said when a metallurgist told her of his nitriding investigation.

A promising paragraph that went by the boards was based on a semantic analysis of a phrase which appeared some time ago in the *Assembly Line*: "*. . . some gadgets . . . will be left off the 1942 models.*" The OPM order that everything be left off the 1942 models killed the item.

But most of all we are sorry we were unable to find a place for a mouth-filling phrase uttered by Ivar Fredholm, the mathematician, concerning omnibus index numbers on carloadings, bank loans, lumber production, etc. He called them "*hermaphrodite arithmetic monsters devoid of all sense.*" The soundness of the observation is debatable, but the sound of the syllables is delectable.

Human Footstool

• • • We see by the papers that the unkind remarks *Pravda*, the Russian newspaper, made concerning the abandonment of Manila drew forth a statement by the U.S.S.R. government that the views expressed were only those of a single individual. The implication was that that individual's knuckles would be rapped. Thus an international incident was avoided.

Time was when many of the big newspapers had an official whipping boy. Whenever an advertiser, or even a reader, complained about anything that appeared in the paper, the whipping boy was hauled on the carpet, bawled out, and fired. His act was to say nothing, just look sad, put on his derby, leave by the front door, and come in the back way.

We can match *Pravda's* article with this: The other day one of this journal's members said, "*Last night I sat in my easy chair, with the Annual in my lap, and my feet on a Cossack.*"

Powdered Statesman

• • • Chet Ober of the advertising staff tells us that he overheard a stomach sufferer say this to a friend about a session with the doctor, "*First he made me take a big dose of some stuff called Bismarck.*"

Star-Spangled Sentences

• • • Speaking of colorful writing, no doubt you noticed that our pride and joy, the Annual Number, abounds in verbal pinwheels and skyrockets. Some samples:

> Government efforts to control scrap prices were born in suspicion and distrust, nurtured with belligerent press releases and G-men investigations and have grown into a misshapen creature that well displays its bastard origin.
>
> • • •
>
> . . . when the fingers of the somber shadow of all-out war were only beginning to close in, the ever-smoldering schizophrenia of the American people flamed with startling abruptness.
>
> • • •
>
> . . . for ignorance and infantilism, manifest in its most vicious form, probably nothing will ever quite approach Senator Nye enthralling a wildly cheering audience with a bitter condemnation of the government for permitting a Navy Yard to sell a monthly scrap list of aluminum while the house-to-house aluminum begging campaign was in progress.

These are but a few of the plums, pulled almost at random, from a rich pudding. For the most colorful single phrase in the big issue we would give the prize to this:

> . . . the government has been so engrossed in giving the industry (aluminum) a public hot-foot that. . . .

No. 1 Slogan

• • • The word *slogan* is Scotch for battlecry, so naturally sloganeers are most fertile during wartimes. Top slogan of 1941 was "*Don't Let Them Catch Us With Our Plants Down*," which we reported here on June 5 as having been first seen by us in the Youngstown Sheet & Tube Company's magazine, *The Bulletin*. We hear that OPM's Iron and Steel Branch has clutched the slogan to its ferrous bosom.

As a candidate for honors in '42 we pass along this one, sent in by our own Sam DeWolf. Whether or not it is original with him we do not know.

BUY DEFENSE STAMPS
AND LICK THE OTHER SIDE

Battlecry for Steel

> For your consideration and possible approval, I am offering below to the steel industry an original slogan designed for commercial exploitation of their product with emphasis upon that product's role in the defense set-up, to wit:
>
> **INGOT WE TRUST**
> —*Jacob Lishchiner, Washington, D. C.*

Electroplated Skin Trouble

• • • Speaking of physical disorders, the most unusual technical term we have seen in a long time appears in the article, "Specification Plating," by Dr. C. B. F. Young (Dec. 18th issue). He writes that one of the ways of testing the thickness of a plating is the *measle chord method.*

For an explanation we will give him a "Win-With-Willkie" button.

Puzzles

Last week's field had 160 acres.
You might toy with this:

A ship, carrying 15 Christians and 15 heathens, encounters a storm. In order to save the ship, one-half of the passengers must be thrown overboard. Accordingly, the passengers are placed in a circle and every ninth man, reckoning from a certain point, is cast overboard. Arrange the circle so that all the Christians will be saved.



Northern Cranes handle all material in the storage yard of this steel mill.

Northern SUPER-CRANES SERVE A WIDE RANGE OF INDUSTRIES

Speed, fine control, excess capacity, exceptional durability, make these Northern Super-Cranes particularly valuable where service is heavy and continuous.

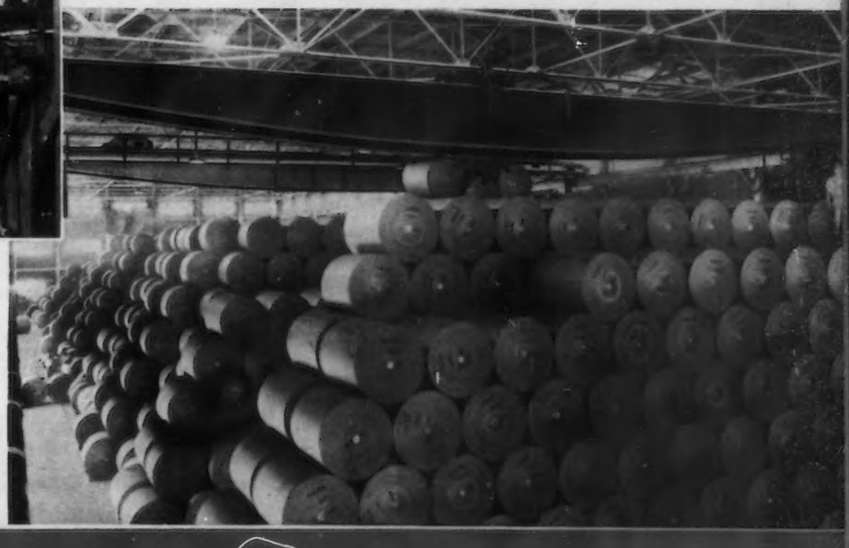
Northern quality assures continuous operation.



Handling plate storage in the warehouse of one of the largest steel fabricators.



achine room crane in one of large southern paper mills.



Northern Cranes handle all paper stored in this warehouse.

NORTHERN ENGINEERING WORKS

2607 Atwater Street — Detroit, Michigan

Dear Editor:

JUDGES 15-15

Sir:

I see that Van Deventer felt it necessary to give a Bible reference when he wrote of the weapon with which Samson slew the Philistines. I hadn't realized that unfamiliarity with the Bible had become as serious as that. I note that he did it "Old Testament, Book of Judges, Chapter 15, Verse 15." That is alarming indeed. "Judges 15-15" ought to be enough for anybody who has even glanced at a Bible. I wonder if the readers know that the Old Testament is in the Bible?

GEORGE APPEL

Witte & Burden
Detroit

STEEL EXHUMATION

Sir:

I read with particular interest your editorial in the issue of May 15 regarding buried steel.

It occurred to me that we have in this country just such a treasure. It is in the abandoned street car tracks now buried under pavements in cities and towns all over this country. This probably will run close to 100 tons per mile of double track.

Why cannot a nation-wide program be organized to induce municipal governments to engage idle unskilled labor, daily frequenting federal employment agency offices, in tearing out these tracks to help supply the need for good scrap steel in our steel melting furnaces? The sale of this scrap would account for a substantial part of the cost of repavement.

GEORGE B. EMENY

Tank and Combat Vehicles Unit
OPM, Washington, D. C.

Sir:

The city of Hartford is laced with abandoned trolley rails. The price is not sufficient to make it worth while to take them up and repair the street. Other cities have the same. If heavy steel scrap is needed, why not pay enough to get it?

J. MERRITT

Hartford Special Machinery Co.
Hartford, Conn.

USE SINTERED ORE??

Sir:

There was a statement on page 244 of the Annual Review Number that attracted my attention. You say that "there is no doubt but what more general sintering practice and utilization of flue dust, likewise, could jump the nation's output. The potentialities of these practices have only so far been scratched."

I understand that in connection with the shortage of scrap in this country the OPM is studying the possibility of using more sintered iron ore on the hearth of the open hearth furnace before putting in the metallic charge. In some cases raw ore had been put in mixed with limestone to flux but this practice brings about two violent reactions which are overcome by using the sintered ore. This sintered ore is said to be improved by sintering fine limestone along with the fine ore.

In addition to the use of sinter on the bottom of the hearth there has also been developed by John E. Greenawalt of this city a very dense "lump ore" for use as lump ore in "oreing down." Such dense sinter is obtained by mixing the fine iron ore concentrates with iron borings and shredded steel turnings. When this mixture is subjected to the heavy suction of the Greenawalt sintering pan (about 50 in. of water) there is a partial bessemerizing effect which burns out most of the carbon in the cast iron borings. This gives a mixture between scrap and iron ore making it necessary to use more of this mixture than if crude ore were used.

RALPH H. SWEETSER

Blast Furnace Consultant
New York

A QUERY FROM CARDIFF

Sir:

I understand THE IRON AGE has published an article on the Hazelett Continuous Process for casting brass. If you could locate a copy of this for me I would appreciate it.

BASIL CURRAN

Edward Curran & Co., Ltd.
Cardiff, England.

● A thorough review of continuous casting processes was published in THE IRON AGE, April 4, p. 31, and April 11, 1940, p. 44. Copies are on their way to you, Mr. Curran.—ED.

PRIORITY PAEAN

Sir:

Kindly send two copies of THE IRON AGE Allocations and Priorities Guide dated Nov. 27, or of any later editions if any have been published. This report is of great value to us and you have done a wonderful service to all in compiling such complete and concise reports.

J. F. McFADDEN

Ordance Plant
The Yoder Co.
Cleveland

● Thanks for those kind words. We've found that many industrial plants, as well as OPM offices, have found the guides helpful. We expect to publish a new, revised, brought-up-to-date edition in the issue of Jan. 29—ED.

MACHINE SHOP ESTIMATES

Sir:

Someone in Chicago, or the Middle West, has edited a book for use in estimating individual operations in a machine shop. I do not know the name of the book nor the address of the publishing house. Can you tell me where I can obtain this book?

H. L. MANN

Manco Mfg. Co.
Bradley, Ill.

● We've scoured the book stores in the East and have plagued all the large technical book publishers, but without success. Can any of our readers help us locate this book for Mr. Mann?—ED.

WHERE IS DUREZ?

Sir:

In the issue of Aug. 21, page 51, appeared an item mentioning the Durez Plastics & Chemicals, Inc. It did not give the address of this company, and we should like very much to communicate with them. Do you have their address?

W. E. TWISS

Byron Jackson Co.
Los Angeles, Cal.

Sir:

We are under the impression that within the last several months you published an article relative to the coating of the inside of castings with some sort of plastic material. This plastic material formed a water tight seal and was bonded through the application of heat by means of low and high pressure steam.

We may have use for this process, and will appreciate your sending us information relative to the name of the manufacturer of the plastic material as well as the issue of your magazine in which this article appeared.

JAMES F. THOMAS

National Radiator Co.
Johnstown, Pa.

● Durez Plastics & Chemicals, Inc., is located at 1911 Walck Road, No. Tonawanda, N. Y.—ED.

SEVEN-DAY WEEK

Sir:

It would be appreciated if you would kindly furnish this office with 10 reprints of the article "How to Operate Seven Days per Week," which was published in the Dec. 25 issue of THE IRON AGE.

LT. H. BATER

Navy Department
Office of Inspection of Naval Materiel
Philadelphia

Sir:

In view of our increasingly heavy schedule of production we are greatly interested in your splendid article "How to Operate Seven Days per Week." If this article is available in reprint form we should greatly appreciate receiving a copy.

GUY B. ARTHUR, JR.

Le Tourneau Co. of Georgia
Toccoa, Georgia

Sir:

On pages 47 to 51 of THE IRON AGE of Dec. 25 you have an article "How to Operate Seven Days per Week." Please be good enough to send us a copy of these pages for our use.

L. RYDHOLM

Flour City Ornamental Iron Co.
Minneapolis



FLAME-HARDENED LATHE BEDS . . .

INSPIRED BY THE *Phantom Gear*

DESIGN ALONE can't account for the success of Monarch's exclusive Flame-Hardened lathe beds —a success proved by the absence of a single instance of failure, wear or scoring in the 5,000 of them built since 1937.

The real power behind this, and the many other Monarch improvements, is what we call "*The Phantom Gear.*" This energizing force is made up of open-mindedness, willingness of management and men to work day and night—and the courage to scrap old ideas and methods that interfere with the building of better lathes.

★ ★ ★

Today, this concentrated effort is turning out a modern Monarch lathe every working hour, day and night, for National Defense. Tomorrow, it will be geared up to produce even better lathes, so that when peacetime industry returns, Monarch will continue to help make more goods for more people at lower cost.

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

Monarch's March of Progress

Many of the outstanding improvements in lathes came from Monarch, such as:

Flame-Hardened beds

Anti-friction bearing mountings for all rotating parts

Helical geared headstock

Flanged spindle nose

Automatic force feed lubrication

Anti-friction taper bearing attachment

Automatic sizing for all size lathes

These accomplishments show the urge at Monarch to build better lathes. This same desire will be reflected in every Monarch lathe of the future. It will pay you to keep in touch with Monarch developments.

MONARCH LATHES

COVER THE TURNING FIELD

This Industrial Week . . .

. . .

INDUSTRY'S search for materials needed for the nation's victory program — 185,000 planes, 120,000 tanks—is being extended to every possible source of supply. Translated into the materials needed, the program is indeed "gigantic," with that word illuminated and spelled out in big letters.

For example, the greatly enlarged tank and airplane program calls for sharp increases in requirements for cast and rolled armor, together with alloy ingot output. A 1942 tank production of 45,000 units, with all other combat vehicles, can only be carried out by an increase in monthly production of cast armor from 28,000 to 59,000 tons, or 708,000 tons for a year.

Special Steel Output Must Climb Sharply

In rolled armor the nation's output will have to be increased to 77,000 tons monthly, or 924,000 tons for a year.

Sixty thousand planes which the President said must be built in 1942 ("Let no man say it cannot be done") will require 809,000 tons of alloy ingots of which 213,000 tons will be for frames and 486,000 tons for engines.

Armor Plate Mill Slated for Lukens

The bulk of the steel to be used for planes in the program will be in forgings, accounting for 50 per cent. Sheets and strip will amount to 12 per cent; cold drawn bars, 10 per cent; tubing, 10 per cent; wire, 4 per cent; hot rolled bars, 6 per cent. Stainless steel allotments of 35,000 tons are reported to have been made for 1942 plane manufacturers under new specifications.

Plant expansion to meet war needs for steel and for other materials and equipment has been under way for months but few weeks pass without new projects being reported. This week, THE IRON AGE learned, authorization has been given for construction of an armor plate mill and a 130-in. plate mill at the Lukens Steel Co. plant. The special treatment steel plant is expected to be rolling armor in a little more than a year, with slabs obtained from Carnegie-Illinois Steel Corp. About a year will be required to complete the 130-in. plate mill.

More Capacity Urged for Bethlehem Steel

Meanwhile, steel expansion projects recommended by the Office of Production Management and awaiting action by the Defense Plant Corp. call for 360,000 tons of additional open hearth capacity, at Bethlehem Steel Co.'s Pacific Coast plants, a 1000-ton blast furnace at the Dearborn, Mich., plant of Ford Motor Co. and an increase of 300,000 tons in ingot mold capacity at the plant of Valley Mold & Iron Corp.

The increased openhearth capacity now recommended for Bethlehem Steel includes 180,000 tons at Los Angeles, 120,000 tons at South San Francisco and 60,000 tons at Seattle. Pig iron for this additional steel capacity will be obtained from the Provo, Utah, furnaces of Columbia Steel Co.

Behind the statistics of the war program, industrial observers everywhere are meeting the same bitter conclusion—that civilian sacrifices through diversion of materials to war use in the United States have only begun. Buyers of peacetime products, like passenger automobiles, need not wait long to see where the materials which might have gone to them are being sent. For example—an order for 340,000 cargo truck bodies, to be completed within a year, has been awarded the E. G. Budd Mfg. Co. by the Army. Die design is almost completed and Budd is expected to go into production shortly with a program calling for 1000 bodies a day for nearly a year and requiring almost 900 tons of steel a day.

Greatly expanded needs for plates for the two-ocean navy and merchant ships have inspired an OPM program for speeding up production through a full, 168-hours-a-week operating schedule, still greater use of continuous strip mills and simplification of orders.

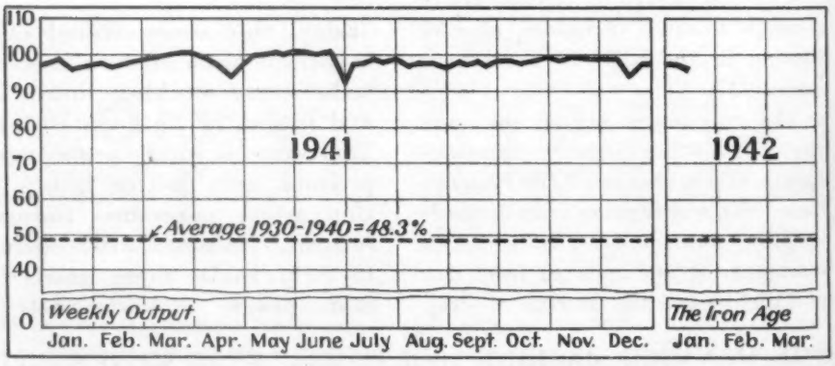
The plan provides for daily reports to the OPM on plate shipments to the Army, Navy and Maritime Commission.

OPM Freight Car Program Is Lagging

While the OPM's freight car program involving building of 45,000 cars in the first four months of this year may not reach its goal, the need for the cars is so urgent that the total may be completed by the end of June. Mechanics of allocating so large an amount of plates,

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S.Ohio River	Western	St. Louis	Eastern	Aggregate
Current Week.....	97.0	101.0	95.0	91.5	96.0	90.0	88.0	94.0	95.5	93.0	104.0	92.0	104.0	96.0
Previous Week....	98.0	101.5	95.0	90.0	97.0	90.0	86.0	94.0	95.5	108.0	97.0	90.0	99.5	96.5

* Revised

for rolling on universal plate mills and strip mills, are so intricate that some time has been lost sending out individual allocations. As a consequence, some plate and strip mills will not be able to get the car plates into their schedules in the quantities expected until late in January.

An indication of what can be done in freight car production is shown by the total of 7181 cars built in private shops in December, a new monthly high for 1941. It is estimated that railroad-owned car shops produced at least 1500 cars in December. In 1941 private shops produced 63,396 freight cars, including industrial cars and 2386 cars for export, while the railroad shops built an estimated 15,900 cars. Freight cars ordered during 1941 for domestic purposes were approximately 123,413 cars, the largest volume since 1924.

Steel Output Off Half Point to 96%

Small declines in steel ingot production rates in the country's two largest producing areas, Chicago and Pittsburgh, were the chief cause of a drop of a half point in the national rate to 96 per cent of capacity. The Pittsburgh rate dropped one point to 97 per cent, while Chicago eased a half point to 101 per cent. Cleveland also showed a loss, declining a point to 96 per cent, while a severe shortage of scrap in Southern Ohio forced a drop there of 15 points to 93 per cent.

Repairs, as well as lack of scrap, were a factor in the week's output decline. However, changes in operations due to repairs in the various districts largely counterbalance, while the net loss in the rate last week may be attributed to lack of adequate supplies of raw materials. With steel so urgently needed for the war program, a fractional point loss or gain in ingot output is highly important. Gains reported in the last week include Philadelphia, 1½ points to 91½; St. Louis, 2 to 92; Wheeling, 2 to 88, and the Eastern District, 4½ points to 104 per cent. Unchanged rates this week were 95 per cent at Youngstown, 90 at Buffalo, 95½ at Birmingham, 94 at Detroit and 97 in the West.

Scrap collections slumped in almost all principal consuming centers due to cold weather of the past week. Lack of automotive scrap affected steel production at Youngstown and Cleveland where additional open hearths were taken off. At Sharon and Buffalo steel production units previously suspending still are idle.

With the iron and steel scrap supply situation now at a critical stage, the latest controversy centers around claims that automobile wrecking yards are not producing the fullest possible volume of scr Scrap brokers and consumers are awaiting effects of the passage of the price bill by Congress. Throughout the country plans are under way to increase metal scrap collections.

Industry's general practice in handling aluminum scrap has been revised through an OPM priorities division order (M-1-D) requiring, beginning March 1, that every plant generating 1000 lb. or more of such scrap a month segregate at the machine the types resulting from its operation. The reason for this order is that unsegregated scrap cannot be reprocessed into the high-grade materials called for by military needs, with resulting losses not only of aluminum but of such alloys as magnesium.

New War Labor Board Headed by W. H. Davis

Washington

• • • To insure against interruption of any work that contributes to the effective prosecution of the war, President Roosevelt this week created by executive order a 12-member national war labor board, and appointed William H. Davis, New York patent attorney and head of the National Defense Mediation Board, as chairman of the group. The board has broad powers to adjust all kinds of labor disputes, including union demands for closed shops.

George W. Taylor, of Philadelphia, professor of economics at the University of Pennsylvania and impartial umpire in the General Motors-CIO's United Automobile Workers contract negotiations, was named vice-chairman.

The OTHER MEMBERS of the board, equally divided among representatives of the public, employers, and employees, are:

PUBLIC: Davis and Taylor; Dean Wayne L. Morse, University of Oregon Law School; and Dr. Frank P. Graham, president of University of North Carolina.

EMPLOYERS: Albert W. Hawkes, president of Congoleum-Nairn, Inc.; Roger D. Lapham, chairman of the board of American-Hawaiian Steamship Co.; E. J. McMillan, president of Standard Knitting Mills, Inc.; and Walter C. Teagle, chairman of the board of Standard Oil Co. of New Jersey.

LABOR: Thomas Kennedy, secretary-treasurer of the CIO's United Mine Workers of America; George Meany, secretary-treasurer of AFL; R. J. Thomas, president of the CIO's United Automobile Workers of America; and Matthew Woll, vice-president of AFL.

In addition to the board, the President appointed four alternates for the employer and labor groups. The new board will absorb the duties of the National Labor Relations Board and the National Defense Mediation Board which was abolished, and the President's order established procedure to be followed in adjusting labor disputes.

A highlighted development on the industrial priorities front this week is the abolition of the Army and Navy priorities critical list. This step was taken through issuance of Priorities Regulation No. 3, discontinuing the use of Forms PD-1 through PD-5 and extending all individual preference ratings by suppliers and sub-suppliers by a simple indorsement like that now used on limited blanket ratings and on ratings under the production requirements plan. The regulation is expected—this may be too optimistic—to cut paper work connected with the priorities system by 60 per cent.

Allocated Orders Heavy in Steel

In the last few days the heavy influx of allocation orders from OPM, plus the large amounts of high priority rated business on steel mill order books, has caused some steel consumers with ratings ranging from A-4 to A-10 to take a back seat until the other material is shipped. Some steel companies have for weeks to come full schedules on allocated steel tonnage and priority rated business ranging from A-1 to and including A-3.



Could you spread your Stainless *Thinner?*

If you manufacture a stainless product which requires the alloy characteristics on only one surface, then single-armor Pluramelt is a material you ought to investigate.

If corrosion has to be resisted on both surfaces, there's double-armor Pluramelt. In either case, large amounts of vitally needed alloys would be conserved for other essential purposes. These two types of Pluramelt use only 20% and 40%, respectively, of the chromium and nickel required for solid stainless steel of the same cross-section.

You benefit in other ways, too. Pluramelt involves favorable first cost, and marked ease of fabrication. It can be produced with almost any grade of stainless on one or both sides of a mild or low-alloy steel base—*and it can't come apart*—a fact we can amply prove to you by laboratory test and field service records.

Let us tell you more about this exclusive material, as it may apply to your products. Just mail the coupon below.

ALLEGHENY LUDLUM
STEEL CORPORATION — PITTSBURGH, PA.
Branch Offices in Principal Cities
STOCKS OF STAINLESS CARRIED BY ALL RYERSON WAREHOUSES

Allegheny Ludlum Steel Corporation S-103
Oliver Building, Pittsburgh, Penna.
I'm interested in Pluramelt—send me data.
NAME_____
COMPANY_____
ADDRESS_____

News of Industry

• • •

OPM Acts to Speed Plate Production

Washington

• • • **Seven-day a week** operations on a full 168-hr. basis, greater use of continuous strip mills, and simplification of orders are outstanding features of the speeded-up plate production program announced last Thursday by OPM Iron and Steel Branch Chief C. E. Adams.

Inspired by pressing needs for a two-ocean Navy and merchant shipbuilding, the program, set forth in letters to producers, contemplates record output, with an estimate of an increase of 12 per cent the present month over the all-time record of about 600,000 tons in December, making approximately 720,000 tons for the current month.

By March a further increase of 10 per cent is expected. The increases, it was pointed out, do not take into account any new facilities now being constructed. Plates are under a complete allocation system.

Under the plan, sheared plate mills will be relieved as far as possible of orders that can be rolled on universal plate and continuous strip mills so that the sheared plate mills will be devoted to war needs which only such mills can roll. To effectuate this arrangement consumers will be asked to change the design of their plate fabricated structures or equipment. Recommendation was made that all continuous strip mills accept minimum quantities of 10 tons. The steps outlined in the program are:

All steel companies are requested to operate plate-making facilities 168 hours a week.

Daily reports on plate shipments to the Army, Navy and Maritime Commission will be made to the Iron and Steel Branch.

Weekly reports on total production will be made.

A plan for greater use of continuous strip mills for the production of plate has been adopted.

Each producer has been asked to name a liaison man to keep in contact with the Branch on plates.

Steps are being taken to improve and simplify plate orders so that greater production may be achieved.

Conferences are being scheduled with individual producers to iron out local problems that interfere with greater production.

Instructions under "General Allocation Order No. 1—Plates" were revised and sent to producers who were requested to advise the Iron and Steel Branch whether they could take immediate action to make greater use of continuous strip mills. Scheduling of individual conferences with producers will be completed by the end of January.

In asking for the selection of a liaison man, Mr. Adams told each mill to be sure that the man chosen is well qualified by experience and has been given adequate authority to assure proper and prompt action on plans taken up.

Reclaimed Beams To be Refabricated

Buffalo

• • • **As a conservation measure, more than 150 tons of steel girders and I-beams in a downtown theater, now being partially demolished, will be refabricated and reused in construction of a new structure on the same site. Steel beams 70 ft. long are to be extended to about 100 ft. by splicing before going into the new building, it was said.**

"Eighty per cent of the building material now being salvaged by the wrecking firm of Morris & Reimann now is going into dwellings for defense workers, or is being used for remodeling or expanding defense plants," a company executive stated.

Substitutes Used in 800 QMC Articles

Washington

• • • **Substitutes for** 800 articles previously used have been introduced in the past six months by the Army Quartermaster Corps for the purpose of conserving critical and strategic materials.

Satisfactory substitutes have been found for bronze finishes previously used for 174 products used by the Army; in 116 items the use of brass has been eliminated; zinc has been eliminated from 93 specifications; nickel from 78 items, copper from 66, bronze from 68, aluminum from 58, linen from 24.

Substitutes which have been authorized for brass include plate glass, soft annealed steel, malleable iron, galvanized iron, cast iron, ceramic ware, cast bronze and steel. In place of copper, sheet lead, steel, galvanized iron, ceramic ware, black iron and bronze are now being specified for many Quartermaster purchases. In many instances where galvanizing has been the standard finish, zinc is being conserved by using paint, porcelain enamel, synthetic enamel, and black japan as the finish. As a base material in a few Quartermaster procurements, zinc is being replaced by galvanized iron or steel.

As a substitute for nickel plating, paint or synthetic enamel is being widely used and bronze or porcelain finishes are being used in place of monel metal, which contains much nickel. Oxidizing, clear lacquer, brass or copper plating, and Parkerizing, a process in which the metal is dipped in a hot zinc oxide solution, are all being used as substitutes for cadmium plating.

Steel, cast iron and malleable iron are being used as substitutes for aluminum. Since steel has also become a critical material, a number of substitutes for it have been added to Army specifications. Among these are concrete, gypsum, wood, plywood, ceramic ware and galvanized iron. For the conservation of aluminum, the Quartermaster Corps is now testing experimental vehicles equipped with cast-iron pistons.

83 Million Tons of Iron Ore is Goal for 1942

Cleveland

• • • **Great Lakes shipping** will be asked to carry approximately 83,000,000 tons of iron ore during the 1942 shipping season, on the basis of a statement made by Charles E. Adams, chief of the Iron and Steel Division of the OPM during a luncheon honoring lake ship operators, captains and chief engineers for their 1941 accomplishment of bringing down the lakes a record tonnage of 80,116,360 tons.

Mr. Adams stated that by May 1 of this year about 4,700,000 net tons of additional pig iron capacity will be put into operation, and experts indicate that this expansion in the national iron capacity would require a lake movement of about 83,000,000 tons.

Charles J. Stilwell, president, Warner & Swasey Co., presented an achievement scroll to Captain Walter Borreson, master of the Columbia Transportation Company's steamer D. Z. Norton. During the luncheon the chief speaker, Captain Howard Vickery, of the U. S. Navy, pointed out that the present Merchant Marine program called for completion of a ship within 14 weeks' time as against the former rate of from 8 to 12 months. Captain Vickery made a plea for Federal encouragement and aid to our Merchant Marine after the war to prevent its scrapping, as occurred following the first World War.

Western Foundry Co. Installs Electric Furnace at Chicago

Chicago

• • • **Electric steel capacity** in this area will be increased by 60 tons a day. D. A. Cullinan, president of Western Foundry Co., here, one of the country's largest jobbing gray iron foundries with a daily capacity of 450 tons, said the company will have a 1½-ton electric furnace in production before the close of February, actual installation now being under way. In addition, two converters and two No. 6 cupolas are being installed by Western at a total cost of about $150,000 the expense being borne by the firm itself. Installation of another electric furnace is under consideration.

Molybdenum Output Slips, Shipments Up in November

Washington

• • • **Production and** shipments of molybdenum (element) were 3,758,200 and 4,458,600 lb., respectively, in November, 1941, as compared with 3,918,900 and 4,135,300 lb. in October, 1941, according to the Bureau of Mines, Department of Interior. The average monthly rate of production and shipments in 1940 was 2,859,400 and 2,110,800 lb., respectively. Stocks at mines at the end of November dropped to 17,902,600 lb. from 18,603,000 lb. at the end of October.

Aviation Show Postponed

Detroit

• • • **The International Aviation** Show which had been scheduled for Jan. 17-26 at Detroit, has been postponed because of the war.

SAVE THAT TIRE! Recapping old tires is fast becoming a big industry in the United States. To furrow the surfaces in preparation for recapping, this workman is using a special brush, the strands of which are rope twisted with needlepoint wires to prevent matting upon application of pressure. The brush was developed by the Osborn Mfg. Co., Cleveland.



Output of Substitute for Tin in Bronze Is Increased

• • • **Phelps Dodge** Copper Products Corp. has announced increased production in a metal that, it is claimed, will effect a substantial saving in the use of tin. This product, known as P-M-G Hardener, can be used in place of tin in the production of bronze castings. It is manufactured in the United States exclusively by Phelps Dodge.

P-M-G Hardener was developed to be used in place of tin and, according to Phelps Dodge, when alloyed with copper in the proper proportions "a bronze is produced that is superior in physical and chemical properties to the regular tin bronzes." The Navy specifications 46B28 and Federal specifications QQ-C-593 already allow the use of P-M-G Hardener in the place of tin and it is expected that other specifications will be issued shortly allowing for a wider use of this product.

November Manganese Output 12,700 Tons

Washington

• • • **Domestic production** of manganese ore containing 35 per cent or more manganese (natural) during November, 1941, was 12,700 gross tons, shipments were 13,000 tons, and producers' stocks at the end of the month were 1000 tons, according to the Bureau of Mines, Department of the Interior. In October, 1941, production was 8600 long tons, shipments were 8500 tons, and producers' stocks at the end of the month were 1300 tons. The rate of shipments averaged 3344 tons monthly in 1940, when the total amounted to 40,123 tons. Alabama, Arkansas, Georgia, Montana, Virginia, Washington, West Virginia, reported shipments of manganese ore in November.

Personnel Conference in Chicago Starts Feb. 4

• • • **Industrial relations** and personnel executives from industries throughout the United States will meet in Chicago Feb. 4, 5 and 6 for the national personnel conference of the American Management Association. The sessions will take place at the Hotel Stevens.

Southern Concern Orders New Electric Furnace

Birmingham

• • • **Connors Steel Co.**, Birmingham, has placed an order with the Pittsburgh Lectromelt Furnace Corp., of Pittsburgh, Pa., for an electric furnace with capacity of approximately 36,000 tons of steel ingots annually. Officials of Connors Steel said the new furnace was scheduled to be in production during March.

Bars, strip, small shapes, cotton ties, barrel hoops and baling bands are produced by Connors, which now has in operation one electric furnace with an annual capacity of 24,000 steel ingots.

Navy Hastens Deals on Land Needed for Plant

Chicago

• • • **The Navy** dispensed with delay caused by the owners of a golf course here and took title to 80 acres of a tract occupied by the course, when a federal court dispensed with the usual condemnation proceedings. The site will be occupied by a $10,000,000 torpedo plant which will employ about 6000 persons. Defense Plant Corp. will own the plant which will be operated by Amertorp Corp., a newly formed subsidiary of the American Can Co.

Harvester Co. Lays Off 4000

Chicago

• • • **International Harvester Co.** will lay off about 4000 out of a total of 30,000 employees producing agricultural equipment. About 2500 have already been laid off. Harvester's McCormick works in Chicago and Rock Island, Ill., have suffered most so far, with layoffs of about 1000 at each plant. Plants least affected will be those producing dairy equipment.

Freight Loadings Over 1941's

• • • **Loading of revenue freight** for the week ended Jan. 3, totaled 674,374 cars, the Association of American Railroads announced last week. The increase above the corresponding week in 1941 was 9.8 per cent, above the same week in 1940, 13.7 per cent, and above the preceding week, 11.2 per cent.



AP Photo

BICYCLES SAVE YOUR CAR: Because automobiles and tires are now rationed, F. R. Carpenter, Colorado Revenue Director, bought himself a bike and pedalled to work to prove his revenue collectors could use bicycles instead of autos. Gov. Ralph L. Carr approved an order for 40 bikes for Carpenter's tax agents, one a woman.

Employee Defense Bond Plan Adopted by U. S. Steel Corp.

• • • **Benjamin F. Fairless**, president of the United States Steel Corp., announces a voluntary plan for employee purchases of defense bonds, to become effective Feb. 1. An employee may authorize deduction from his monthly earnings of any amount in multiples of $3.75 or $18.75. Mr. Fairless explained that the plan had been adopted at the suggestion of the United States Treasury.

Air Corps Demands 7-Day Week on Aircraft Orders

Detroit

• • • **The demand that defense** plants operate seven days a week was made in Detroit last week by Col. Alonzo M. Drake, supervisor of the Central Air Corps Procurement District. His statement followed the issuance of a special War Department order to thousands of contractors working on munitions orders. Col. Drake has jurisdiction over all plants with Air Corps contracts from the Appalachians to the Rockies and between Canada and the Gulf. "From now on there can be no difference between week days and Sundays for companies working on aircraft orders," he said.

Cleveland Has Received $1 Billion in War Orders

Cleveland

• • • **The Cleveland Chamber of** Commerce has announced that about $1,000,000,000 worth of war orders in the form of direct government contracts and subcontracts has been placed with local manufacturers since June, 1940. Since that time, plant expansions costing $153,115,000 have added 8,981,881 sq. ft. of manufacturing space, and payrolls have risen from $4,175,000 weekly to $6,500,000, exceeding the previous peak of $5,020,000, reached in May, 1929. Employment has increased 35 per cent.

Heating, Ventilating Show Postponed; Meetings Set

• • • **Conditions** have made it advisable to postpone the seventh International Heating and Ventilating Exposition which was scheduled to be held at Philadelphia, Jan. 26 to 30, this year. A poll of all exhibitors indicated that the majority favored postponement. Plans for the 48th annual meeting of the American Society of Heating & Ventilating Engineers, at the Bellevue-Stratford, Philadelphia, Jan. 25-29, are going forward. The National Warm Air Heating & Air Conditioning Association will also meet in Philadelphia, Jan. 27-29, at Benjamin Franklin Hotel.

12 Groups Forming Manufacturing Pools

Philadelphia

• • • **With four groups** of manufacturing pools already in operation in Pennsylvania and eight more scheduled to go into operation within the next 30 days, the organization of resources of small plants is getting well under way, according to A. A. Cutting, who is in charge of organizing manufacturing pools and shop groups in the state for the Division of Contract Distribution of OPM.

The "mother hen" groups for the most part have been organized at the urgent request of the manufacturers in the group who have been faced with curtailment of operations because of raw material restriction. In contrast to other types of pools, organized by the manufacturers themselves, such as at York, Pa., and pools where subcontractors are regular suppliers of parts for large manufacturers, these DCD pools are all made up of very small shops, numbering from 10 to 20 in a pool. The variety of machine tools available in a group determines the number of members in the pool. One group will normally require about 1000 employees for 'round-the-clock production schedule.

The pools already organized are in Philadelphia, Lock Haven, Scranton, and Lansdale, and one of these groups alone obtained $250,000 worth of contracts during December. The Philadelphia group, most recently formed, in their first bid on a government job was very close to being the lowest bidder, and may get the contract.

The advantage of the small manufacturers pool system, obviously is that many plants can come under the wing of the group and engage in cooperative business, yet at the same time render a service to the defense program by handling the manufacture of some specific part that, when added to the parts made by other members of the pool, make up a complete unit. Furthermore, in addition to expanding the production of war materials, the pools save the jobs of many thousands of Pennsylvania employees and employers whose livelihoods and businesses inevitably have been threatened by increasing shortages of materials.

The pools are informal, Mr. Cutting explained, and any member may still go after civilian or government business on his own, refuse business, get a contract for himself alone, or get a contract that he will want to sub-contract among all or any other part of the group. The pool system gives each manufacturer in the group perfect freedom of activity, and the advantage of being able to go after contracts too big to handle alone, advising his potential customer that he will do part in his own shop and that his fellow pool members will do the rest.

After the formation of a pool, the Division of Contract Distribution does not attempt to get contracts for the group. This is entirely up to the business acumen of the pool members. The DCD does, however, supply the group with list of prime contracts let so the members can go to the contractors for sub-contracts, and also supplies the Army, Navy, Maritime Commission and prime contractors with a list of the facilities of the pool to encourage sub-contracting.

Pools expected to be in operation within the next month will be those in Norristown, Lancaster, Reading, York, Wilkes-Barre, Stroudsburg, Easton, and another pool in Philadelphia. These pools are being formed at the urgent request of manufacturers in these districts who, in many instances, have unsuccessfully tried to get government work for their own individual plants. Plans are under way for organization of similar pools throughout the state.

NOT SPAGHETTI, STEEL GIRDERS: These steel girders, gnarled and iced, are what is left of the Hudson River pier at 41st Street after it was destroyed by a five-alarm fire at 5 a. m., Jan. 8. The spray from the hoses in zero weather iced up the twisted remains of the pier.

Press Photo



Conservation Council Formed

• • • **The Formation** of the Waste Materials Conservation Council of Greater New York has been announced to help bring out scrap. The New York Chapter of the Institute of Scrap Iron & Steel is participating.

12 Million Ton Output Sets Bethlehem Record

• • • E. G. Grace, president of Bethlehem Steel Corp., announced last week that the company in 1941 produced 12,155,476 net tons of steel ingots, an all-time record. The previous record was 10,704,741 net tons in 1940.

December's production reflected continuous output in the holiday period, the month's total being 1,067,499 net tons, compared with 1,054,261 in October 1941, the previous record for a single month.

Seized Kearny Shipyards Returned to Company by Navy

• • • Pursuant to an executive order of President Roosevelt, the plant of the Federal Shipbuilding & Dry Dock Co., Kearny, N. J., was returned to the company by the Navy, at midnight Jan. 6. The plant was taken over by the Government in August, after the company and the Industrial Union of Marine and Shipbuilding Workers of America had been unable to come to agreement in settlement of a strike that was holding up many millions of dollars worth of defense orders. Negotiations for a new contract will be continued by the company with Local 16 of the union, and in the meantime the wage rates negotiated and established by the Navy Department during its operation of the plant will be continued.

Wisconsin Employment at High

Madison, Wis.

• • • Factory employment and wages reached an all-time high in Wisconsin in 1941 with 291,000 workers sharing weekly wages of $9,406,000 according to the state Chamber of Commerce. These figures compare with a previous high of $6,771,000 wages for 264,500 employees in 1929.

Metal Products Corp. Formed

• • • Metal Products Corp. has been formed by George L. Kuehn, son of Louis Kuehn, who founded, and for many years was president, of Milcor Steel Co., Milwaukee. The new firm which has purchased the property of the Lubenow Mfg. Co., and will continue to make screw machine products.

Loss of Auto Business Affects Transport Fields

Buffalo

• • • Conversion of many auto-carrier vessels, used to bring new automobiles from Detroit to Buffalo, into bulk freighters and grain boats was foreseen by marine men here this week.

About 600 "drive-away" companies here are concerned with the problem of putting to use expensive equipment used in transporting out of Buffalo the 200,000 new cars which came here by boat annually from Detroit.

Fees for hauling range from $16.50 a car to more than $20. Virtually all this business now will be lost, local haulers are complaining, although some see hope of conversion of their equipment into vans for the handling of wartime freight.

Chicago Coke, Pig Iron Needs Down With Auto Curtailment

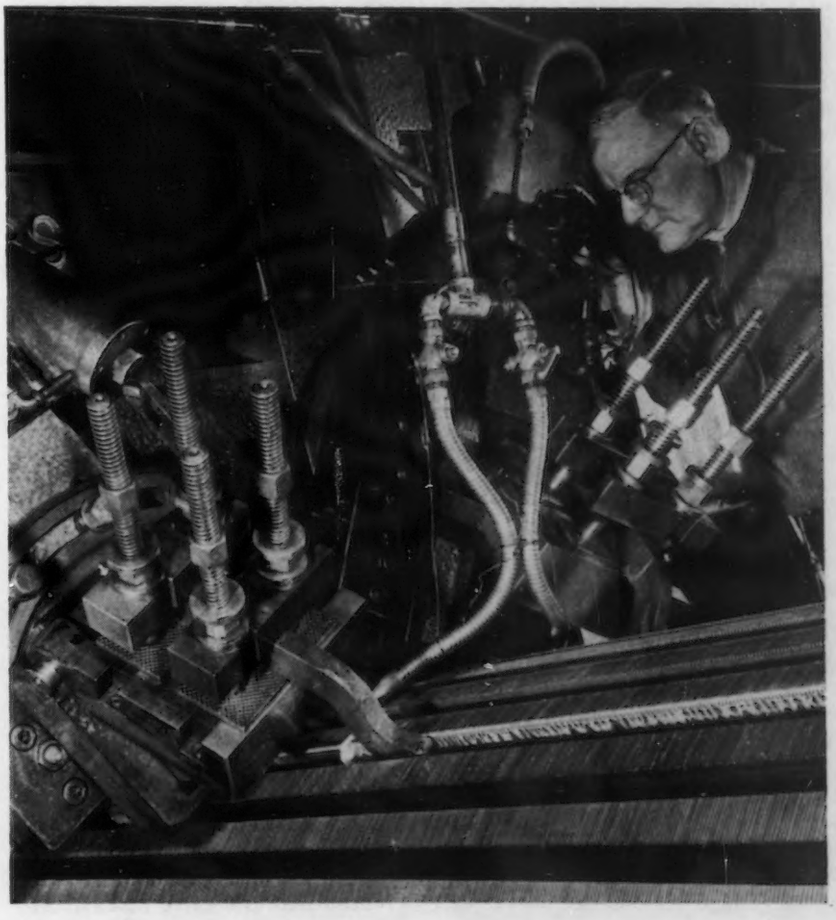
Chicago

• • • A number of foundries in this area have reduced their pig iron and coke requirements as much as 25 per cent due to abolition of automotive production, which has drastically affected parts suppliers in this territory. Curtailment of other non-essential industries has also reduced pig and coke requirements so that the coke supply in ths area is actually "easy" now.

Sales Record Set by Chain Belt

• • • Chain Belt Co., Milwaukee, reported a new sales record of $12,419,000 for ten months ended Oct. 31, 1941. Net income for the same period was $922,033 compared with $1,039,075 for all of 1940.

IDEA SPEEDS PRODUCTION: Albert Bachofer, whose idea for speeding up his own job at Westinghouse Electric & Mfg. Co., East Pittsburgh, earned him $750, is shown operating a cutter as it grooves slots in an electric power generator rotor. A veteran of 14-years' experience, Bachofer suggested a compressed air device to lift the tool from the slot on the return stroke, thus speeding up production 40 per cent on the machine.



Non-Ferrous Metal Controls Are Tightened By OPM Orders

Washington

• • • **Steps to tighten control** over the major non-ferrous metals were taken by OPM last week as war officials began to lay plans for acquiring sufficient materials to meet the production requirements of President Roosevelt's new victory program. Segregation of aluminum scrap according to alloy content and form was made mandatory in one order, while full priority controls were established on lead in another order. Several changes in the handling of both primary and scrap copper were announced and tin and lead scrap were placed under strict priority control.

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• • • **Segregation of aluminum** scrap, which may be a forerunner of similar action to be taken with other scarce metals such as stainless steel, is made mandatory by Supplementary Order M-1-d, issued by OPM on Jan. 7. Importance of the new segregation program is indicated by OPM estimates that 100 per cent segregation of sheet scrap alone will provide, at the rate of production next July, enough high-grade aluminum each month for several hundred airplanes, and at the same time save enough magnesium for the manufacture of thousands of incendiary bombs.

Strict segregation of aluminum scrap by type has not in the past been a general practice in the industry. Much of the scrap generated was formerly lumped and sold for use in products not requiring high-grade material.

See "How to Segregate Aluminum Scrap" on opposite page.

The new order, clamping airtight controls over the treatment and disposition of all types of aluminum scrap, requires that, beginning March 1, every plant generating 1000 lb. or more of such scrap per month must segregate, at the machine, the types resulting from its operations. Reason for the order is that unsegregated scrap cannot be reprocessed into the high-grade materials called for by military needs, with resulting losses to essential production not only of the aluminum itself, but also of such valuable constituent alloys as magnesium. The new order supersedes the aluminum scrap controls formerly embodied in Supplementary Order M-1-c, and repeals the A-10 preference ratings extended to smelters with defense orders under order P-12.

Outstanding in the scrap segregation program laid down by the order is the requirement that all 17S, 24S and 52S alloy scrap in solid form, such as sheet clippings, be sold to the Aluminum Co. of America or Reynolds Metals Co., and that all other segregated scrap be sold to these two firms or to a limited list of "Approved Smelters," whose names are listed in the order.

Under the order, dealers are similarly required to sell scrap which they accumulate to producers or approved smelters, and are only permitted to re-sell to other dealers where the amount accumulated in the regular course of business does not make it practicable to sell directly to the approved firms.

No person, other than a producer or approved smelter, may melt, reprocess or otherwise use aluminum scrap, according to the order, without specific instructions from OPM. A foundry which melts aluminum may use his own scrap, provided, however, that this scrap goes back into the making of products for which the foundry is currently obtaining an aluminum allocation from OPM.

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Lead Use Restricted

• • • **Sweeping restrictions** on the use of lead were ordered last week by OPM, with the issuance of conservation order M-38-c. The order follows the pattern of the copper and tin conservation orders, prohibiting the use of lead in a list of civilian manufactures and curtailing the amount to be used in more essential ones.

At the same time, an amendment was issued to the general imports order, M-63, adding lead to the list of materials that cannot be imported except by the Metals Reserve Co., RFC subsidiary.

The lead order provides that after April 1, 1942, the metal cannot be used in the manufacture of automobile body solder, as ballast or keels for pleasure boats, as blocks for cutting leather, in building supplies, in caskets and casket hardware, in foil, ornamental glass, regalia, badges and emblems, statuary and art goods, tennis court markers, toys, and as weights for bats, clocks, decoys, dresses, golf clubs and jockey saddles.

From Jan. 1 to March 31 uses of lead for these items must be restricted to 50 per cent of the amount used in either the third or fourth quarters of 1941. Most other users of lead are restricted, by quarters, to 90 per cent of the amount used in either the third or fourth quarters of 1941.

No restriction is placed upon the use of lead in military contracts, or for certain other Government agencies; where it is called for in underwriter or safety regulations, on preference ratings of A-1-j or higher, for use in manufacturing plants where corrosion makes lead imperative; in scientific and industrial laboratories and hospitals where chemical action would make its use necessary, or in the items listed in the order.

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Controls Set on Tin, Lead Scrap

• • • **Tin and lead scrap** have been placed under priority control by OPM with the issuance of general preference order M-72. The order makes Priorities Regulation No. 1 applicable to all transactions in tin and lead scrap and provides for monthly reports by scrap dealers and consumers.

A scrap dealer is forbidden to accept deliveries unless, during the preceding sixty days, he has disposed of scrap in an amount equal to his inventory on the date of delivery. Provision is also made for direct allocation of tin or lead

scrap if this is necessary in the interests of the war program.

Copper Orders Amended

• • • **Designed to keep** a constant flow of copper scrap and copper alloy scrap into defense work, OPM has issued a revision of order M-9-b which provides that no deliveries of copper or brass scrap may be made except to a scrap dealer, or, in the case of brass mill scrap, to brass mills, without specific authorization of the Director of Priorities.

The amended order revokes order P-61, which assigned an A-10 rating to certain users of copper and brass scrap and changes the provisions of M-9-b which permitted deliveries on such ratings. Under the new ruling, deliveries may be made only as specifically authorized, with the exception of dealers and brass mills. Form PD-130 is provided for applications for such authorization.

Fabricators, with the exception of railroads and utilities, may not use or remelt scrap generated in their own operations, or dispose of it except by sale, without specific authorization. No fabricator may keep on hand more than 30 days accumulation of scrap unless the total is less than five tons. Those who generate more than 2000 lb. in a month must report complete scrap inventories by the 15th of the following month.

In another order privately-imported copper heretofore not subject to regulation was placed under priority control by OPM, in a revision of General Preference Order M-9-a, the expiration date of which is June 30. Effective immediately, the order places tighter restrictions on copper.

Other main changes in the order are:

1. Toll agreements relating to the processing of copper must now be approved by the Director of Priorities.

2. The exception permitting unregulated delivery of less than 50-lb. orders of copper in any one month is revoked.

3. A rating of A-9 is assigned to warehouses to permit replenishing of stock sold for war orders. A quota basis, on 1941 sales, is set up as an additional check on the application of this preference rating.

Titanium Order Revised

• • • **Titanium pigment** dealers must file monthly requirement certificates before the 20th of the month so that producers will be able to close their books in time to calculate pro-rata reductions in orders, according to amendment No. 2 to M-44, issued last week by OPM.

Other changes prevent seasonal users from obtaining more than their annual quota, and redefine the term "producer" of titanium pigment to relieve secondary producers from the necessity of setting aside a percentage reserve of their production, as is required of primary producers who process ilmenite or other ores. The latter change was said to be for the benefit of producers of titanated lithopone who purchase titanium dioxide from primary producers who have already set aside the required reserve.

Drum Steel Sizes Revised

• • • **Sheet steel** and steel drums to be used for overseas shipment of all kinds of products may be of any gage hot rolled sheet steel, according to amendment No. 1 to preference rating order M-45, effective Jan. 6, OPM has announced. The expiration date of the order is now made indefinite instead of May 30, 1942.

The original order restricted sheet steel to be used in the manufacture of steel drums to 16 and 18 gage and also restricted the use of the drums to shipment abroad of oil, gasoline and petroleum products.

The removal of the limitation on gage and use will make available a greater supply of sheet steel for the manufacture of steel drums for a wide range of products to be shipped abroad, such as phosphorous, resin, etc.

At the same time, preference rating order P-76 was amended to enable a manufacturer of steel drums for foreign shipments to replenish inventories of sheet steel of all gages for such purposes. The original order covered only 16 and 18 gage steel.

Vacuum Cleaners Restricted

• • • **A 33 per cent** average curtailment in production of domestic vacuum cleaners during the first quarter of 1942 was ordered on Tuesday by OPM. Meanwhile two other orders affecting both non-mechanical and mechanical refrigerators were also issued. One excludes from existing production quotas any mechanical refrigerators produced for United States government agencies, allied governments, lend-lease requirements and for defense housing where contracts were obtained as the result of competitive bidding.

The other order provides similar exemptions and for the first quarter of 1942 cuts steel consumption 40 per cent below the monthly average used in the year ended June 30, 1941, or in the three years ended June 30, last year, or whichever is the fairer base period. Under the original program the use of steel in ice boxes was curtailed 35 per cent.

Priorities Set on Tung Oil

• • • **Tung oil was** brought under strict priority control last week by OPM's General Preference Order M-57. Tung oil is obtained chiefly from China and it was stated that future supplies are subject to the uncertainties of shipping from the Far East. Under arrangements now being made the Defense Supplies Corp. will purchase all existing supplies and all future imports.

By the terms of the order, deliveries of tung oil are prohibited except to fill orders listed below, and use of tung oil is prohibited except under certain specified conditions.

How to Segregate Aluminum Scrap

• • • **OPM order M-1-d** requires that all aluminum scrap be segregated by form and alloy. The procedure to be followed in separat-

ing such scrap, as specified by OPM, is described here.

By Alloy Content

Scrap of each individual alloy (for example, 17S, 24S, 52S, 112, 645, etc., also 2S pure aluminum) shall be segregated from scrap of other alloys.

Exception: In any division of a plant devoted to any one phase of operations, no more than the three most important alloys need be segregated.

Scrap from coated material (Alclad or Pureclad sheet) may be included with uncoated material of the same alloy specification; but scrap from painted material shall not be included with unpainted material of the same alloy specification except in very minor amounts.

By Form

In addition to the above segregation on the basis of alloy content, scrap of each alloy shall be segregated into two form types:

(1) *Solids*—Generated by shearing, clipping, cutting, blanking, or similar process, also defective or rejected wrought aluminum parts, defective or rejected castings and gates, sprues, risers or similar foundry scrap.

(2) *Machinings*—Generated by machining, drilling, boring, turning, milling or like operations.

In no event shall solids and machinings be combined. Grindings, sawings or other fines, drosses, skimmings and sweepings need not be segregated as to alloy specification but shall be treated as mixed scrap as provided below.

Mixed Scrap

All scrap which is not required to be segregated as to alloy content as above provided, or which cannot be identified as to alloy content, shall be classified as mixed scrap. However, mixed scrap consisting of (1) drosses and skimmings, (2) solids, and (3) machinings shall be handled separately from each other and from all other mixed scrap.

General Provisions

Official responsible for handling scrap. Each person operating a plant shall appoint a responsible employee to supervise the collection, segregation and handling of all scrap generated in the plant. The name of such employee shall be forwarded to the Aluminum and Magnesium Branch, Office of Production Management, Washington. All such functions shall be performed by employees in the plant acting under direction of such supervisory employee. No dealer or other person not a regular employee of the plant shall perform any such functions except as the Director of Priorities may specifically authorize.

Collection and Identification: Segregation shall be effected by collection at the machine where the scrap is generated. Separate containers for collection and bins for storage shall be provided for scrap of each alloy as distinct from other alloys, and also for the solid scrap and for the machining scrap of the same alloy. All containers and bins shall be clearly marked to identify the alloy and the form of scrap for which they are intended, and they shall be kept clean, dry and in good condition, so that their contents shall be protected from contamination and the weather. Each container and bin shall be used only as a receptacle for the alloy and form of scrap for which it is designated and marked.

Identification of Segregated Scrap for Shipment: Each unit of segregated scrap shall, upon shipment, be clearly marked or labeled as to alloy specification, form, and the plant where generated.

Obligation of Subcontractors: Each person operating a plant, as part of his arrangement with any subcontractor to whom he furnishes aluminum, shall impose an obligation upon, and otherwise make every effort to see to it that, such subcontractor institutes and carries out an adequate scrap collection and segregation program.

Move to Cut Widths and Gages in Shipbuilding

Philadelphia

• • • **To simplify plate** allocations and speed deliveries of new and standing plate orders, OPM is attempting to standardize specifications by reducing the number of widths and gages of plate material used in ship construction.

Shipbuilders and plate producers are being consulted to determine how the great variety of widths and gages of plates now on order can be reduced so that production will be substantially speeded up.

In some instances, old orders for plates of strip mill sizes are being re-allocated from plate mills to producers with high speed strip mill equipment made available by curtailment of automobile production.

At present, plates are being rolled in some 50 different gages, and it is believed the variety of thicknesses can be reduced to about 16 different gages. Likewise, plate widths vary greatly with the individual ship builders, and standard widths are being urged so that as much shearing as possible will be avoided.

Ship builders are now being canvassed to determine how such a program can be effected and how quickly.

Gray Iron Society Moves

Washington

• • • **The Gray Iron Founders'** Society has moved its offices to 1719 K Street, N.W., W. W. Rose, executive vice-president, has announced. The new telephone number is Republic 4750.

Revisions for The Iron Age Priorities Guide

• • • **Following revisions are to be made to THE IRON AGE Priorities and Allocation Guide published in the Nov. 27 issue. These items should also be properly indexed on pages 1 and 2 of the Guide.**

Under "M Orders," page 4, add:

M-1-d—Makes mandatory the segregation of aluminum scrap according to alloy content and form (1-7-42). Revokes P-12.

M-9-a—Privately imported copper placed under priority control (1-7-42) Related Form: PD-227.

M-9-b—Amendment (12-31-42). Establishes tighter restrictions on copper and copper alloy scrap. Related form: PD-130.

M-38-c—Lead placed under full priority control. (1-10-42)

M-51-a—Authorizes a national inventory of pig and hog bristles (1-7-42). Report on form PD-217.

M-57—Tung oil placed under priority control. (1-8-42)

M-72—Tin and lead scrap placed under priority control. (1-8-42)

M-52—Allocates supply of sulphite among 120 users. (1-9-42)

P-68—Amendment No. 1—(1-8-42). Extends priority aid to Canadian iron and steel plants operating the U. S. Related forms: PD228 PD-228, PD-81.

Under "L Orders," page 4, add:

L-5-a—Exempts mechanical refrigerators made for specified war use from production quotas. (1-6-42)

L-7-a—Further restricts domestic non-mechanical refrigerator output; sets first quarter quotas; units made for specified war uses exempted from quotas. (1-6-42)

L-18-a—Further curtails output of vacuum cleaners; establishes first quarter, 1942, quotas. (1-6-42)

L-20—Amendment No. 1 (1-10-42). Further restricts use of cellophane and similar transparent materials.

L-27—Restricts use of scarce material in production of vending machines. (1-31-42)

Under "OPA Price Ceilings," page 5, add:

No. 66—Retreated and recapped tires.

Sloss on Ferromanganese

Birmingham

• • • **Sloss-Sheffield** Steel & Iron Co.'s No. 3 furnace will continue to run on ferromanganese this week, officials report.

THIS WEEK'S Prices and Priorities

Lead use subjected to drastic restrictions in non-defense use in Order M-38-c, effective Jan. 10. Lead also added to import control list of Order M-63. (OPM: PM2102)

Graphite removed from import control Order M-63 and replaced by lead. (OPM:PM2102)

Machine tool Order E-1-a, which was to become effective Jan. 10, suspended. Order E-1 remains effective. (OPM:PM2106)

Aluminum scrap segregation by alloy content and form made mandatory in supplementary Order M-1-c. (OPM:T140)

Copper which is privately imported placed under full priority control in amendment to Order M-9-a. Other changes in order also announced. (OPM: T141)

Steel drum makers working on export business given priority aid covering all sizes of sheet steel in amendment to Orders M-45 and P-76. (OPM: PM2069)

Methyl alcohol use as an anti-freeze prohibited, except for defense use, in amendment to Order M-31 effective Dec. 31, 1941. (OPM:PM2079). Ethyl alcohol use restricted in amendment to Order M-30. (OPM:PM2087)

Molasses use in beverage spirits prohibited; other restrictions established. (OPM:PM2087)

Pig and hog bristle users required to report all stocks owned by them on form PD-217. (OPM:T138)

Titanium pigment Order M-44 amendment revises date of filing consumers' reports of requirements and exempts secondary producers from pool requirements. (OPM:T143)

Automobile and light truck makers given priority rating of A-3 for acquisition of specified rubber parts, other than tires and tubes, needed to complete January quotas. (OPM:PM2101). Heavy and medium truck production in February set 15 per cent above February, 1941, according to amendment to Order L-1-a setting quotas. Passenger carrier production boosted 138 per cent. (OPM: PM3001)

Vacuum cleaner output quotas for the first quarter further reduced. (OPM:PM2064)

Vending machine manufacturers use of scarce material severely curtailed in Order L-27, effective Dec. 31. (OPM:PM2063)

Tin and lead scrap placed under full priority control in Order M-72, effective Jan. 8. (OPM:PM2097)

Acetic acid price schedule No. 31 corrected with respect to export prices. (OPA:PM2088)

Asphalt roofing price schedule No. 45 revised with respect to certain West Coast quotations. (OPA: PM2049)

Railroad equipment accessory makers withdraw price increases announced in October. (OPA:PM2055)

Used steel drum price schedule No. 43 revised; price set for raw used drums, regardless of to whom sold. (OPA:T145)

Portable power tool makers asked not to raise prices; meeting in Washington scheduled for Jan. 17. (OPA:PM3003)

Copper scrap purchases above maximum prices by three chemical producers permitted by OPA. (OPA:T146)

Mechanical regulator manufacturers withdraw previous price increases and cancel proposed advances at request of OPA. (OPA:2122)

Retreaded and recapped tire prices placed under a ceiling in price schedule No. 66 issued Jan. 10.

Steel plate production to be stepped up by new program proposed by OPM; includes daily report on shipments and operation of mills 168 hr. per week. (OPM:PM2095)

Tung oil placed under priority control by Order M-57. Deliveries prohibited except on orders rated A-2 or higher. (OPM:PM3000)

Preference orders extended include: P-40 to March 10, 1942.

Canadian iron and steel mills operating in U. S. assigned priority ratings for repair and operating supplies by amendment to order P-68 Jan. 8. (OPM:T142)

Sulphite pulp supply allocated among 120 users and emergency pool established by order M-52 issued Jan. 9. (PM-2119)

Cellophane and similar transparent material use ban extended to a number of additional outlets in amendment to order L-20 issued Jan. 10. (OPM: PM2123)

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For copies of above announcements address defense agency concerned at Washington, giving announcement number as shown in parentheses after each paragraph. (**For example, OPM:PM200** *means announcement* **2000** *issued by Office of Productive Management*).

Automotive Engineers Elect A. W. Herrington President

• • • **A. W. Herrington, noted designer** of military and civilian motor vehicles for specialized off-the-road services, has been elected president of the Society of Automotive Engineers for 1942. Mr. Herrington is president of the Marmon-Herrington Co., Inc., of Indianapolis. He joined the SAE at the end of World War I, in which he served as captain of motor transport. He developed numerous specialty truck designs during the years 1921 to 1931 in association with various automobile companies and with the U. S. Army and Marine Corps as consulting engineer. Late in 1931, came formation of the Marmon-Herrington Co., Inc., which has provided millions of dollars worth of military equipment to the anti-axis nations throughout the world.

Election of the following officers and Councilors to serve with Mr. Herrington also was announced. Treasurer, David Beecroft, Bendix Products Division, Bendix Aviation Corp.

Vice-Presidents representing: Aircraft Activity—Peter Altman, director, Manufacturing Research Department, Vultee Aircraft, Inc.; Aircraft-Engine Activity—C. F. Bachle, vice-president, charge of research, Continental Aviation & Engineering Corp.; Diesel-Engine Activity—H. L. Knudsen, chief engineer, Cummins Engine Co.; Fuels & Lubricants Activity—C. M. Larson, chief consulting engineer, Sinclair Refining Co.; Passenger-Car Activity—Ernest E. Wilson, director, General Motors Proving Ground; Passenger-Car-Body Activity—E. L. Allen, sales engineer, Reid Products Division, Standard Products Co.; Production Activity—Joseph Geschelin, Detroit technical editor, Chilton Co.; Tractor & Industrial Activity—L. S. Pfost, chief engineer, tractor division, Massey-Harris Co.; Transportation & Maintenance Activity—Jean Y. Ray, supervisor automotive equipment, Virginia Electric & Power Co.; Truck & Bus Activity—F. B. Lautzenhiser, chief transportation engineer, International Harvester Co.

Councilors: W. S. James, chief engineer, Studebaker Corp.; J. V. Savage, superintendent, City of Portland (Oregon) municipal shops & M. V. inspection station; T. P. Wright, assistant chief, aircraft section, OPM.

Continuing on the Council for 1942 will be: N. C. Milliman, product service manager, General Motors of Canada, Ltd.; H. O. Mathews, automotive engineer, Public Utility Engineering & Service Corp.; D. A. Fales, associate professor of automotive engineering, Massachusetts Institute of Technology. Serving on the 1942 Council as past presidents will be A. T. Colwell, vice-president, Thompson Products, Inc., and Arthur Nutt, vice-president of engineering, Wright Aeronautical Corp.

"War Market Opens" at Philadelphia

Philadelphia

• • • **Representatives of more** than 60 manufacturing firms attended the preview of a War Market, parts and bits of war materials exhibit that will be held for the duration of the war, on Monday, Jan. 5, at the OPM offices in Philadelphia. Display boards of jobs and products that prime-contracts are willing to sub-contract for manufacture are shown, and will be changed regularly as the work is completed.

The exhibit now is open to possible subcontractors, and attendance has been averaging close to 600 a day. In addition to the displays placed by large manufacturers, there are ordnance displays installed by the Naval Aircraft Factor, the Marine Depot Quartermaster, the Ordnance Department, and the Quartermaster Depot of the Philadelphia district.

The War Market is sponsored and manned by the Division of Contract Distribution, under the direction of Edwin W. Graff, educational chief of the Philadelphia office. "Nearly everyone that comes in feels that he can handle the manufacture of some part of the exhibit," said Mr. Graff, "because the display scales down the problem of producing big units to terms that the small manufacturer can understand and handle." The War Market met with instantaneous approval of small plant owners, and similar exhibits are planned for Harrisburg and Pittsburgh within the next 60 days. In conjunction with the display, the regular bulletin of the DCD, showing work to be sub-contracted is being distributed to various manufacturing firms in the district.

Canada to Stop Auto Output

• • • **To divert** to a maximum the vast production facilities of the Canadian automobile industry into direct war channels, the manufacture of passenger automobiles will be stopped as and when existing inventories of already fabricated parts are assembled, C. D. Howe, minister of munitions and supply, announced Jan. 5.

In the interim the production rate per month will be one-half the 1941 rate, and will call for assembly to be completed by the end of March or early in April. A reserve of passenger automobiles will be established immediately as a "bank" or "pool" for emergency purposes. These vehicles will be made available only by a permit from the motor vehicles controller.

Toronto Firm Gets Order of $13 Million for Small Ships

Toronto

• • • **Toronto Shipbuilding Co.,** Ltd., a Government controlled company, has received a contract from the Department of Munitions and Supply, for construction of 15 minesweepers of a new and larger type than those formerly built in Canada, to cost approximately $13,000,000. Work on the new ships will start at once. In conformity with a production speeding policy recently adopted by Desmond A. Clarke, director general of the Shipbuilding Branch, the company will confine work exclusively to construction of minesweepers.

Department of Munitions and Supply, for the period Dec. 24-30, placed war contracts of $16,516,488, including six contracts to United State firms valued at $775,542. Awards include:

Ordnance—John Inglis Co., Ltd., Toronto, Ont., $2,016,000; Atlas Steels, Ltd., Welland, Ont., $539,897; George White & Sons Co., Ltd., London, Ont., $6405.

Munitions—Government of the United Kingdom, through Department of Munitions & Supply, Overseas Accounting Branch, Ottawa, Ont., $555,488; Millen & Freres, Montreal, Que., $9665.

Metals—Atlas Steels, Ltd., Welland, Ont., $46,843.

Aircraft—Aviation Electric, Ltd., Montreal, Que., $30,673; Canadian Wright, Ltd., Montreal, Que., $334,505; Noorduyn Aviation, Ltd., Montreal, Que., $309,311; Railway & Power Engineering Corp., Ltd., Montreal, Que., $36,891; Standard Tube Co., Ltd., Ottawa, Ont., $10,436; Fleet Aircraft, Ltd., Fort Erie, Ont., $29,730; MacDonald Bros. Aircraft, Ltd., St. James, Man., $15,170.

Land Transport—Gutta Percha & Rubber, Ltd., Toronto, Ont., $107,976; Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., $30,059; B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., $32,361; Eastern Steel Products, Ltd., Montreal, Que., $9900; C. T. Lount, Winnipeg, Man., $14,896.

Dockyard equipment—Anglo-Canadian Wire Rope Co., Ltd., Montreal, Que., $14,054; Canada Wire & Cable Co., Ltd., Montreal, Que., $18,755; Page-Hersey Tubes, Ltd., Toronto, Ont., $30,611; Donald Ropes & Wire Cloth Co., Hamilton, Ont., $12,282; Lister Iron Works, Vancouver, B. C., $5095.

Electrical equipment — Canadian Marconi Co., Montreal, Que., $420,000; Canadian National Telegraph Co., and Great Northwestern Telegraph Co. of Canada, Montreal, Que., $65,778; R.C.A. Victor Co., Ltd., Montreal, Que., $420,000; Northern Electric Co., Ltd., Ottawa, Ont., $2,535,025.

German Armament Production Down

• • • Germany is producing more planes, tanks, and submarines now than during the peak production period during the spring of 1941, according to the British Ministry of Economic Warfare, yet overall armament production has fallen somewhat.

In Nazi-held Europe armament production has not been fully utilized for several reasons. Shortages of raw materials in France, internal trouble and dissention of the general population in Czecho-Slovakia, and shortages of workers and food supplies in Italy have done much to restrict production in these areas.

Irreplaceable stocks of nickel and copper are expected to be exhausted by the end of this year at current consumption rates, according to the Ministry.

Dominion Steel Builds Blast And Open Hearth Furnaces

Toronto

• • • **Dominion Steel & Coal** Corp., Ltd., Sydney, N. S., will construct a blast furnace, as part of its expansion program. This step is said to be due to shortage of scrap. The company now has three blast furnaces blowing to capacity with rated capacity of 1200 tons per day, and is also installing a new open hearth furnace, and putting its plate mill in shape for production, to begin within the next six weeks.

Canadian Mills Aided By Priority Action

• • • **Canadian iron** and steel producers operating within the United States, its territories and possessions have been assigned an A-3 preference rating by OPM for the acquisition of repair, maintenance and operating supplies by an amendment to preference rating order P-68, effective immediately. For material necessary to repair breakdowns, an emergency rating of A-1-a was made available, and advance purchases to prevent breakdowns were assigned an A-1-c rating, but only by specific authority of the Director of Priorities. Producers are required to file form PD-228 semi-annually.

Machine Tools to be Under Ceiling; Other Price Developments

• • • **According to reports** early this week, prices of standard new machine tools will be established as of Oct. 1, 1941, under a maximum price order which is expected to be issued immediately. No official announcement has been made from Washington but leading machine tool makers have been given an indication of the probable price action.

It may be that escalator clauses will be provided on extended deliveries, over nine months from the date of receiving the order. Special machines or special attachments probably won't be affected by the price schedule.

The establishment of price maximums based on Oct. 1 levels may force downward revisions in a few types of machine tools.

Used Barrel Amendment

• • • **OPA amended** Price Schedule No. 43, on steel barrels and drums, Jan. 9, fixing a ceiling of $1.25 each for "raw" used steel barrels or drums, (50-55 gal. capacity, 18 gage steel) when sold to "any person" by the emptier. Oct. 1, 1941, is inserted in Paragraph (e) of section 1306.210 in order to stabilize the base for determining the prices of used drums of other than the standard. It is also stated that the lower of the prices quoted by Rheem Mfg. Co. must apply as the ceiling under Paragraph (e).

Formerly the schedule only imposed this ceiling price when the drums were sold direct to users. This left sales by emptiers to others than users free of any restriction. Prices were bid up, and peddlers and dealers could only charge $1.60 upon the resale.

Portable Tool Stabilization

• • • **Portable power driven tool** manufacturers were asked not to raise prices above the levels prevailing Oct. 1, 1941, by OPA last Friday, as a meeting was scheduled for Jan. 17 for the industry to submit data prefatory to the establishment of ceilings.

Bars Increase in Fuel Oil

• • • **OPA on Jan. 9 denied** oil company applications for permission to increase prices of grade C bunker fuel oil at East Coast and Gulf Coast locations. The companies desired to raise prices 15c. a barrel to $1.50 in New York harbor with corresponding advances at other points.

OPA asserted the following maximum prices for Bunker C and No. 6 fuel oil, f.o.b. refineries and terminals (ex lighterage) should be maintained for all transactions:

	Per Bbl.		*Per Bbl.*
Albany, N. Y.	$1.55	Providence, R. I.	$1.35
New York	1.35	Charleston, S. C.	1.30
Philadelphia	1.35	Savannah, Ga.	1.30
Baltimore	1.35	Jacksonville	1.30
Norfolk, Va.	1.35	Tampa, Fla.	1.25
Portland, Me.	1.35	New Orleans	.85
Boston	1.35	Gulf Coast	.85

RETREAD TIRE PRICES: Price Schedule No. 66 covering retreaded and recapped rubber tires was issued Jan. 10, establishing maximum prices which may be charged for "basic tire carcasses"; for retreading and recapping, and for retreaded or recapped tires. The maximum price of the tire may not be more than the total of the maximum price of the carcass used and the maximum price for the retreading or recapping, based upon the market price of camelback used and the depth of tread design imposed. The price schedule is effective Jan. 19. A ceiling over used tire prices is expected to be announced in a few days in the form of an amendment to the schedule of maximum prices over new tires.

COPPER SCRAP FOR CHEMICAL USES: Permission to buy for chemical use limited amounts of specially prepared copper scrap at a price higher than the established maximum ceiling has been granted to three chemical producers by OPA. The premium price approved is 11¼c. per lb., f.o.b. shipping point, against the ordinary ceiling of 10 or 10½c., depending on quantity.

ACETIC ACID CORRECTION: A press release (PM 2009) outlining a revision of Price Schedule 31 (acetic acid) contained errors. The premiums of 1 cent to 3 cents allowable in the case of export sales of acetic acid (except on sales to Canada and Mexico) are "per pound" and not "per hundred pounds."

PRICE ADVANCES WITHDRAWN: Three makers of railroad equipment accessories have withdrawn October price increases at the request of OPA. They are Westinghouse Air Brake Co., Youngstown Steel Door Co., and Edna Brass Mfg. Co. A fourth concern, Electric Service Supplies Co., Philadelphia, which had made minor advances in certain industrial supplies, has also rescinded the increases. Two makers of oil field machinery and equipment—New Deal Specialty Co., Inc., Tulsa, and Reed Roller Bit Co., Houston, cancelled price increases.

Four makers of mechanical measuring instruments have withdrawn price increases previously in effect and cancelled increases proposed for January, 1942, announced OPA Jan. 10. The companies are: American Meter Co., New York; Crosby Steam Gage & Valve Co., Boston; Mason-Neilan Regulator Co., Boston; Mercoid Corp., Chicago.

Metals Reserve Offers Premiums

• • • **To stimulate** the production of copper, lead and zinc, the Metals Reserve Corp. will pay premiums for production in excess of 1941 output, according to announcement Jan. 12 by Jesse H. Jones, chairman of the Reconstruction Finance Corp.

He said Metals Reserve will pay 11c. per lb. for zinc, East St. Louis; 9.25c., New York, for lead; and 17c. Connecticut Valley for copper. The premiums will be paid also to mines which were not operated at all in 1941 and to new mines but will not apply to production already arranged for by specific agreement.

Borax Advances Suspended

• • • **OPA announced** Jan. 12 that American Potash & Chemical Co. will suspend for 30 days price advances of $1 per ton on borax and $2 per ton on boric acid. A study of prices in the industry is expected to be completed later this month, said OPA.

List of Government-Established Maximum Price Ceilings

	Price Schedule No.	Date Effective (Originally)
Acetic acid*	31	Sept. 29, 1941
Acetone*	36	Oct. 27, 1941
Alcohol, ethyl*	28	Sept. 15, 1941
" normal butyl*	37	Oct. 27, 1941
" wood*	34	Oct. 10, 1941
Aluminum scrap, secondary ingot*	2	Mar. 24, 1941
Asphalt and tar roofing materials	45	Dec. 12, 1941
Bags, second hand	55	Dec. 16, 1941
Brass mill scrap*	12	July 22, 1941
Burlap	18	Aug. 16, 1941
Castings, steel*	41	Nov. 15, 1941
Cigarettes	62	Dec. 26, 1941
Civilian emergency defense materials	48	Dec. 10, 1941
Supplement 1. Flashlights, flashlight batteries, bulbs	"	Dec. 10, 1941
Coal, anthracite (Revoked Sept. 18, 1941)	27	Sept. 12, 1941
Coal, bituminous (Revoked May 1, 1941)	5	April 3, 1941
Cocoa beans, cocoa butter	51	Dec. 11, 1941
Coffee, green	50	Dec. 11, 1941
Coke, by-product foundry*	29	Oct. 1, 1941
Copper*	15	Aug. 12, 1941
Copper scrap*	20	Aug. 19, 1941
Cotton goods, carded gray and colored yarn	35	Oct. 21, 1941
Cotton goods, gray	11	June 28, 1941
" yarns, carded	33	Oct. 6, 1941
" yarns, combed	7	May 26, 1941
Doors, Douglas fir	44	Dec. 12, 1941
Drums, used steel*	43	Dec. 1, 1941
Fabric, upholstery furniture	39	Nov. 10, 1941
Fats and oils	53	Dec. 13, 1941
Fats and oils, elimination of speculative and inflationary price practices with respect to	25	Aug. 29, 1941
Floor coverings, wool	57	Dec. 16, 1941
Floor coverings, resale	65	Jan. 5, 1942
Formaldehyde*	21	Aug. 20, 1941
Glycerine*	38	Nov. 10, 1941
Hair, washed cattle tail and winter hog	24	Aug. 27, 1941
Hardware, builders'*	40	Nov. 19, 1941
Hides, kips and calfskins	9	June 16, 1941
Iron and steel products*	6	April 17, 1941
Iron and steel products, resale*	49	Dec. 15, 1941
Kapok	59	Dec. 22, 1941
Leather	61	Dec. 29, 1941
Lumber, Douglas fir peeler logs and Douglas fir plywood	13	Aug. 5, 1941
Lumber, Douglas fir	26	Oct. 1, 1941
" Douglas fir doors	44	Dec. 10, 1941
" Douglas fir peeler logs	54	Dec. 20, 1941
" Southern pine	19	Sept. 5, 1941
Machine tools, second-hand*	1	Feb. 17, 1941
Nickel, pure, scrap; monel metal scrap, stainless steel scrap, nickel steel scrap and other scrap materials containing nickel, secondary monel ingot, secondary monel shot, and secondary copper-nickel shot*	8	June 2, 1941
Oil, Pennsylvania grade crude	22	Aug. 23, 1941
Paper board, sold east of the Rockies	32	Oct. 1, 1941
Paper, waste, sold east of the Rockies	30	Oct. 1, 1941
Pepper	52	Dec. 11, 1941
Pig iron*	10	June 24, 1941
Rags, old	47	Dec. 20, 1941
Rail, relaying*	46	Dec. 2, 1941
Rubber, reclaimed	56	Dec. 20, 1941
Scrap, iron and steel	4	April 3, 1941
Silk, raw and waste	14	Aug. 4, 1941
Steel and iron products*	6	April 17, 1941
Steel and iron products, resale*	49	Dec. 15, 1941
Stoves; domestic, heating and cooking	64	Jan. 5, 1942
Sugars, raw cane	16	Aug. 14, 1941
" refined (direct consumption)	60	Dec. 22, 1941
Tin, pig*	17	Aug. 16, 1941
Tires and tubes	63	Jan. 5, 1942
Tires; retreaded and recapped	66	Jan. 19, 1942
Wax, paraffin	42	Dec. 1, 1941
Wool and wool tops and yarns	58	Dec. 18, 1941
Zinc scrap and secondary slab*	3	Mar. 31, 1941

* Indicates schedule as of Jan. 1, 1942, will be found in THE IRON AGE of Jan. 1, 1942.

Voluntary Price Ceilings; OPA Stabilization Efforts

In general, the following table summarizes price actions in industries where no formal price schedules have been issued. The government agency making the requests or warnings mentioned below is OPA or its predecessor, OPACS.

Ammonium Sulphate—May 26, 1941—Producers of fertilizer and distributers asked to maintain prices unchanged.

Asphalt—Dec. 6, 1941—Manufacturers asked to make 1942 sales contracts at levels no higher than contracts signed Jan. 1, 1941.

Auto tires and tubes—Aug. 5, 1941—OPACS says no increase in consumer prices warranted beyond actual amount of manufacturers' increases. (In Price Schedule No. 63 issued Dec. 31 maximum retail prices are established.)

Bedsprings, mattresses, etc.—Nov. 21, 1941—Makers asked to hold prices at Nov. 1 levels.

Bleaching powder—Dec. 19, 1941—Stabilized by agreement for early 1942 deliveries. In carload lots, 800-lb. drums, price is $2.25.

Book, printing and writing paper—Nov. 27, 1941—For first quarter of 1942, prices generally stabilized at level of last 1941 quarter.

Bread—June 17, 1941—Leading bakers asked to refrain from price advances.

Brass ingot—Jan. 5, 1942—OPA submits approved list of prices to producers, intended to become effective Feb. 1.

Carbon Black—June 23, 1941—Producers and distributors asked not to make price increase of 12½ per cent for third quarter. (On deliveries beginning Jan. 1, 1942, price advances permitted.)

Cadmium—Aug. 28, 1941—Agreement reached by OPA and leading producers to maintain top price of 90c. per lb. for sticks; 95c. for anodes to users.

Coke Oven Byproduct Chemicals—Dec. 16, 1941—Producers of benzol, toluol, xylol, solvent naptha (from byproduct ovens) asked not to sell during first quarter of 1942 at over 1c. per gallon above fourth quarter of 1941.

Coke, blast furnace, beehive—Dec. 19, 1941—Producers asked to make no advance beyond a price of $6 per net ton to consumers.

Drop Forgings—Nov. 13, 1941—Producers asked not to exceed prices that prevailed Oct. 10. Meeting called to discuss a longer range price program.

Engines, diesel—Dec. 20, 1941—Makers asked to adhere to Oct. 1 prices.
Electrical Appliances, small, for households—Nov. 25, 1941—Makers asked to hold prices at Nov. 1 levels.

Farm Implements—April 22, 1941—Makers asked not to increase prices.
Furniture, office—June 23, 1941—Manufacturers asked to cease open price quotation method and halt further price advances.
Ferromanganese—Dec. 11, 1941—Major producers indicate they will not advance prices for first quarter of 1942 beyond fourth quarter of 1941 levels.
Ferrosilicon—Dec. 11, 1941—Producers agree to maintain fourth quarter prices during first quarter of 1942. The 50 per cent grade which represents the largest tonnage production is $74.50 per gross ton in carload lots, with freight allowance to St. Louis.

Iridium—Jan. 15, 1941—OPACS says further price advances unjustified.

Lead—April 5, 1941—OPACS warns ceiling may be necessary. Producers asked not to sell above 5.85c. per lb., New York.
Lead, scrap—Aug. 16, 1941—OPACS warns prices of scrap lead have risen too far, and must be lowered.

Machine Tools—May 7, 1941—Builders asked not to advance prices.
Machinery, mining—Oct. 11, 1941—Producers asked to refrain from advancing prices.
Machinery, glass making—Nov. 6, 1941—Prices stabilized at July 29, 1941, levels.
Machinery, cranes, hoists and derricks—Jan, 5, 1942—Makers asked not to raise net sales prices above Oct. 1, 1941, levels.
Machinery, ceramic—Jan. 5, 1942—Makers asked to adhere to level prevailing Oct. 1, 1941.
Mercury—Aug. 15, 1941—Warning by OPACS that prices are out of line at $192 per flask.
Machinery, printing—Nov. 6, 1941—Prices stabilized at level of July 29, 1941.
Machinery, textile—Dec. 1, 1941—Makers asked to refrain from price increases. Study being made toward formal schedule of maximum prices.
Machinery, shoe—Dec. 2, 1941—Manufacturers asked not to increase rental prices while study is being made toward formal price schedule.

Oil, crude—Nov. 7, 1941—Producers, marketers and refiners asked to refrain from making advances over the Oct. 1, 1941, level.
Oil, motor—Aug. 4, 1941—Pennsylvania grade refiners asked to base prices upon 33c. per gallon for dominant grade, 200 Pennsylvania neutral, 25 pour test, and to maintain current differentials for other grades.

Paper; book, printing and writing—Nov. 27, 1941—Prices stabilized for first quarter of 1942 at level of fourth quarter of 1941.
Pulp—Oct. 10, 1941—Agreements obtained with producers not to exceed over remainder of 1941 the prices that generally prevailed during third quarter. On Nov. 26 agreements were extended for first quarter of 1942.
Pyrophosphate—Dec. 12, 1941—A major producer reduces prices from 5½c. to 5¼c. per lb. and agrees to keep price reduced in first quarter of 1942.

Radio, receiving sets, parts—Nov. 6, 1941—Prices stabilized at Oct. 15, 1941, levels.
Railroad car wheels—June 25, 1941—Makers asked to withdraw price increase proposed for July 1.
Railroad equipment—Nov. 21, 1941—Makers requested to adhere to Oct. 1 levels.
Resins and shellacs, natural—Dec. 13, 1941—Importers and other sellers asked not to raise prices above levels of Dec. 5.
Rubber Footwear—Dec. 3, 1941—Request to refrain from price boosts over Dec. 3 levels.
Rugs and carpets—Nov. 8, 1941—Stabilized at Oct. 13 levels by series of agreements.
Rubber, scrap—Dec. 11, 1941—Leading dealers asked not to raise prices above Dec. 5 levels.
Rubber, retreading—Dec. 3, 1941—Camelback makers asked not to raise prices.

Silico-manganese—Dec. 11, 1941—Producers have entered into individual agreements with OPA not to raise prices in first quarter of 1942.
Solvents, industrial—Aug. 30, 1941—Producers and dealers asked not to raise prices above July 29, 1941, levels. (Later formal schedules were set on acetone, acetic acid, ethyl alcohol, etc.)
Stoves, heating and cooking, domestic—Nov. 6, 1941—Prices stabilized at level prevailing Oct. 24, 1941. (Manufacturers' ceiling prices announced Jan. 2, 1942, in a formal schedule.)
Sulphuric acid—Dec. 18, 1941—A leading producer agrees to continue during first quarter of 1942 the prices of final 1941 quarter.

Titanium pigments—Jan. 2, 1942—Prices stabilized for first quarter of 1942 at levels of Oct. 1, 1941.
Tools, portable power driven—Jan. 9, 1942—Makers asked not to raise prices above Oct. 1, 1941, levels.

Upholstery fabrics, for furniture—Oct. 3, 1941—Stabilized at levels prevailing Oct. 3. Formal schedules announced Nov. 11.

Zinc sheets, strip and plates—Dec. 2, 1941—Producers asked to adhere to OPA-approved price list effective Dec. 5.

THESE MEN SAY "NO AUTOS": Meeting in Washington, left to righ, Paul Hoffman, president of Studebaker Co., Leon Henderson, OPA head, Edsel Ford, president of Ford Motor Co., William Knudsen and Sidney Hillman, OPM heads, outlined the war assignments of the automotive industry for all-out production of war materials by the industry.



1941 Steel Output 65% Above 1917 Peak

• • • **Almost 83,000,000** tons of steel were produced in 1941, or nearly 25 per cent more than the previous peak output achieved in 1940, the American Iron and Steel Institute reports. Output in the last quarter of the year was ahead of any previous quarter on record.

The total of 82,927,557 net tons of steel ingots and castings produced in 1941 compares with 66,981,662 tons in 1940. The 1941 tonnage exceeds by 65 per cent the peak output during World War I, 50,467,880 tons in the year 1917.

During 1941, the industry's plants operated at an average of 97.4 per cent of capacity, as compared with 82.1 per cent during 1940, and 90.8 per cent in 1917.

Production in December totaled 7,163,999 tons, as against 6,969,987 tons in November, and 6,495,357 tons in December, 1940. The rate of operations in December was 98.1 per cent of capacity, as compared with 98.3 per cent in November and 94.1 per cent in December, 1940.

	STEEL INGOT OUTPUT IN NET TONS					PER CENT OF CAPACITY			
	Open Hearth	Bessemer	Electric	Total	Weekly Output	Open Hearth	Bessemer	Electric	Total
1940									
January	5,356,444	285,447	122,832	5,764,723	1,301,292	85.7	56.1	77.0	83.4
February	4,208,249	205,458	112,090	4,525,797	1,093,188	72.1	43.2	75.2	70.0
March	4,078,843	191,568	118,772	4,389,183	990,786	65.3	37.6	74.5	63.5
1st Quarter	*13,643,536*	*682,473*	*353,694*	*14,679,703*	*1,129,208*	*74.4*	*45.7*	*75.6*	*72.3*
April	3,808,031	176,419	116,024	4,100,474	955,821	62.9	35.8	75.1	61.2
May	4,583,771	258,741	125,270	4,967,782	1,121,395	73.4	50.8	78.5	71.8
June	5,222,120	305,115	130,208	5,657,443	1,318,751	86.3	61.9	84.3	84.5
2nd Quarter	*13,613,922*	*740,275*	*371,502*	*14,725,699*	*1,131,875*	*74.2*	*49.5*	*79.3*	*72.5*
1st 6 months	*27,257,458*	*1,422,748*	*725,196*	*29,405,402*	*1,130,542*	*74.3*	*47.6*	*77.4*	*72.4*
July	5,269,701	322,567	132,357	5,724,625	1,295,164	84.5	63.5	83.2	83.0
August	5,670,932	369,770	145,681	6,186,383	1,396,475	90.8	72.6	91.3	89.5
September	5,535,198	365,289	155,759	6,056,246	1,415,011	91.7	74.2	101.1	90.6
3rd Quarter	*16,475,831*	*1,057,626*	*433,797*	*17,967,254*	*1,368,412*	*89.0*	*70.1*	*91.7*	*87.7*
9 months	*43,733,289*	*2,480,374*	*1,158,993*	*47,372,656*	*1,210,339*	*79.2*	*55.1*	*82.2*	*77.5*
October	6,059,792	408,317	176,433	6,644,542	1,499,897	97.0	80.2	110.6	96.1
November	5,872,162	420,448	176,497	6,469,107	1,507,950	97.1	85.3	114.2	96.6
December	5,907,840	399,434	188,083	6,495,357	1,469,538	94.8	78.6	118.2	94.1
4th Quarter	*17,839,794*	*1,228,199*	*541,013*	*19,609,006*	*1,492,314*	*96.3*	*81.3*	*114.3*	*95.6*
Total	*61,573,083*	*3,708,573*	*1,700,006*	*66,981,662*	*1,281,210*	*83.5*	*61.7*	*90.3*	*82.1*
1941									
January	6,276,429	451,637	200,019	6,928,085	1,563,902	99.1	76.0	91.0	96.9
February	5,673,289	378,330	186,281	6,237,900	1,559,475	99.2	70.5	93.9	96.6
March	6,461,936	460,169	209,536	7,131,641	1,609,851	102.0	77.4	95.4	99.7
1st Quarter	*18,411,654*	*1,290,136*	*595,836*	*20,297,626*	*1,578,353*	*100.1*	*74.8*	*93.4*	*97.8*
April	6,135,941	395,009	225,999	6,756,949	1,575,046	100.0	68.6	106.2	97.6
May	6,365,172	444,361	243,705	7,053,238	1,592,153	100.5	74.8	110.9	98.7
June	6,103,767	458,242	238,721	6,800,730	1,585,252	99.5	79.6	112.2	98.2
2nd Quarter	*18,604,880*	*1,297,612*	*708,425*	*20,610,917*	*1,584,237*	*100.0*	*74.3*	*109.8*	*98.2*
1st 6 months	*37,016,534*	*2,587,748*	*1,304,261*	*40,908,543*	*1,581,312*	*100.1*	*74.5*	*101.6*	*98.0*
July	6,089,859	489,239	242,584	6,821,682	1,543,367	94.4	85.0	87.4	93.4
August	6,243,100	495,523	262,334	7,000,957	1,580,351	96.6	85.9	94.4	95.7
September	6,058,731	500,687	260,288	6,819,706	1,593,389	97.0	89.8	96.9	96.4
3rd Quarter	*18,391,690*	*1,485,449*	*765,206*	*20,642,345*	*1,572,151*	*96.0*	*86.8*	*92.9*	*95.2*
9 months	*55,408,224*	*4,073,197*	*2,069,467*	*61,550,888*	*1,578,228*	*98.7*	*78.6*	*98.2*	*97.0*
October	6,427,977	532,863	281,843	7,242,683	1,634,917	99.4	92.3	101.4	99.0
November	6,198,368	488,986	282,633	6,969,987	1,624,706	99.0	87.5	105.0	98.3
December	6,395,387	481,706	286,906	7,163,999	1,620,814	99.2	83.6	103.4	98.1
4th Quarter	*19,021,732*	*1,503,555*	*851,382*	*21,376,669*	*1,626,839*	*99.2*	*87.8*	*103.2*	*98.5*
Total	*74,429,956*	*5,576,752*	*2,920,849*	*82,927,557*	*1,590,479*	*98.8*	*80.9*	*99.6*	*97.4*

Source: American Iron and Steel Institute. The percentages of capacity operated in the first six months are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940, as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as of June 30, 1941, as follows: Open hearth, 76,079,130 net tons, bessemer 6,793,400 net tons, electric 3,272,370 net tons.

'41 Biggest Year For U. S. Steel Shipments

• • • Shipments of finished steel products by subsidiary companies of United States Steel Corp. for December, 1941, totaled 1,846,036 net tons, against 1,624,186 net tons in the preceding month (November), an increase of 221,850 net tons, and with 1,544,623 net tons in the corresponding month in 1940 (December), an increase of 301,413 net tons.

For the year 1941, shipments were 20,458,937 net tons compared with 15,013,749 net tons (year-end total after adjustments) in 1940, an increase of 5,445,188 net tons. Monthly shipments as currently reported during the year 1941, are subject to adjustments reflecting annual tonage reconciliations. These will be comprehended in the cumulative yearly shipments as stated in the annual report.

Shipments for December, 1941, were an all-time high for that month. Previous high December was in 1940 when 1,544,623 net tons were shipped. Shipments for the year 1941 were the highest of any year in the history of the U. S. Steel Corp. the previous high year being 1916 when 17,105,397 net tons were shipped.

Plant Expansion Starts For Division of Bendix

South Bend, Ind.

• • • **A $1,000,000 plant** expansion for war production is being made here for the products division of Bendix Aviation Corp. Ground has already been broken for the addition which will provide work for about 700. The building will cost about $300,000 and the remainder will be used to purchase machinery.

Eaves Hardware Simplified

Washington

• • • **An estimated** elimination of 275 items, with a substantial saving of metal, will result from a revision of existing simplified practice recommendations, effective Feb. 1, covering eaves troughs, conductor pipe and ridge rolls, according to the Department of Commerce. The revision, known as Simplified Recommendation R29-42, eliminates double bead eaves trough in the 4, 5, 6, and 7-in. sizes, together with all accessories in all grades of material and gages.



Try This in Your Shipping Room

What a difference it makes when the loading or unloading of trucks becomes an almost automatic operation—without effort—without strain—without waste of time. Here, one man does it all, simply by pressing buttons.



...Machine Shop Heavy parts go to and from machines, smoothly and accurately — without operator fatigue. "Spot Handling" like this lets men and machines produce more.



Or Storage Rooms These are just a few of the many places where the Zip-Lift saves money with fast "through the air" handling of materials. It costs surprisingly little, too! For the Zip-Lift is the only real wire rope hoist in the low price field with full magnetic push-button control. Just hang it up by hook, bolt, or trolley and plug into any standard electrical circuit.

An interesting bulletin called "Handle It Through the Air" shows many other ways a Zip-Lift saves and earns money. Write for Bulletin H-20.

General Offices: 4401 West National Avenue, Milwaukee, Wisconsin

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS



100 LB. LOTS OR "BY THE TON"

Steel Moves FAST In This Warehouse

Taking bulky, odd-sized orders from stock bins to the shipping platform is a tough job. And it has to be done fast. In addition, this warehouse presented difficulties that went further than the handling of steel. The building had not been designed for monorail operations, and sharp angles made smooth handling a problem.

To meet this particular problem, Reading engineers recommended this installation to take steel from stock bins to delivery trucks *in one operation*. Results: Orders shipped out faster, Greater safety for workers, More work done per hour by every man.

Remember that when *results* and *savings* are in the specifications . . . it pays to rely on Reading's engineering ability.

READING CHAIN & BLOCK CORP.
DEPT. A-1 READING, PA.



READING
Chain Hoists, Electric Hoists, Cranes and Monorails

OPM Abolishes Critical List; PD Forms Cut

Washington

• • • **Abolition of** the Army and Navy priorities critical list was announced on Monday by OPM with the issuance of Priorities Regulation No. 3, discontinuing the use of Forms PD-1 through PD-5, and permitting the extension of all individual preference ratings by suppliers and sub-suppliers by a simple endorsement like that now used on limited blanket ratings, and ratings under the production requirements plan.

The regulation is expected to cut paper work connected with operation of the Priorities System by 60 per cent, and provides two new forms, PD-1-a and PD-3-a, replacing the present forms PD-1 to PD-5. Use of the new forms will be optional on and after Feb. 2, and mandatory on and after March 1.

Preference ratings assigned to applicants who use PD-1-a may be extended on and after Feb. 2 to suppliers and subsuppliers of the applicant by the prescribed endorsement on purchase orders, signed by an authorized representative of the company making the extension, and will not require a counter signature from any government officer. Previously, preference ratings assigned on PD-1 forms have not been extendable under any circumstances. The original applicant's suppliers and subsuppliers may also extend the rating to obtain any material to be delivered in accordance with the rating.

The original rating, however, may not be used to obtain capital or productive equipment—a new PD-1-a is made necessary by the regulation. Inventories depleted by filling an order so rated may be replaced by use of the rating.

Form PD-3-a, replacing forms PD-3, PD-4 and PD-5, will be used for all defense agencies and allied governments. Ratings assigned on Form PD-3-a may also be extended to suppliers and subsuppliers without counter signature. Ratings assigned on PD-3 forms were formerly extendable without counter signature only if the amount of the order involved was less than $500.

BOYS TOWN GETS A XMAS GIFT: More than 1000 shop and office employees of Allis-Chalmers Mfg. Co., pitched in to buy this low current arc welding unit for the training shop at Boys Town, Neb. The unit was presented to Msgr. E. G. Flanagan, founder of Boys Town, left, by C. N. Allen, manager of the Allis-Chalmers Omaha office. Helmets and accessories accompanied the gift.



Pegler for Girdler As Head of Production

• • • Columnist Westbrook Pegler in The New York "World-Telegram" and other newspapers Tuesday of this week said a candidate even better than Leon Henderson to head up wartime U. S. production would be Tom Girdler. . . . "One of the most valuable men in the United States."

M. A. Hanna Co. Subsidiary To Develop Manganese Pits

Cleveland

• • • **The M. A. Hanna Co.**, iron ore mining and shipping concern, announces that its subsidiary, Manganese Ore Co., will begin immediate development of extensive manganese ore claims in Clark County, Nevada, and construction of a $4,500,000 treating mill, to be financed by the Defense Plant Corp. The manganese content of this ore averaging 20 per cent, will be concentrated into 60-65 per cent nodules by a sulphur dioxide refining process in the new mill, whose daily capacity will permit handling of 1000 tons of ore and production of about 300 tons of nodules therefrom. The entire output of the new mine will be taken by the Metals Reserve Co.

The Hanna claims contain enough manganese to maintain full scale open-pit operations for from 3 to 4 years. Additional reserves exist to maintain the mill longer, if conditions warrant. The concentrating process was developed for the company by the Pan-American Engineering Co., after laboratory and pilot plant experimentation.

In the pioneering of new ores, this is the second major step undertaken by the Hanna Co. for defense purposes within the year. The first was launched last August in northern New York State where the long-idle Clifton iron ore deposits were reopened. Officers of the Manganese Ore Co. are: George M. Humphery, president; M. C. Lake and H. L. Pierce, vice-presidents; and W. A. Maier, secretary-treasurer.



Less Fatigue • Power Driving • Fewer Operations = 50% Less Assembly Cost with Phillips Screws

It's less work to do more work with Phillips Recessed Head Screws!

Let's analyze that. Phillips Screws cling to the driver — giving the operator one free hand to steady the job. Snug contact between driver and recess means more efficiency — no strength wasted as when trying to hold blade driver in slotted head. That's *less work*.

Now: *more work*. Operators have higher output because, with no danger of driver slippage, power drivers can be used in more cases. Fewer operations, too: no pilot holes, no withdrawing crooked screws, no split screw heads, no burrs to file off.

Phillips Screws are saving manufacturers 50% in screwdriving time, which also means: assembling *two* parts for the *price* of *one!*

Write to any of the firms listed below for further facts.



PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

Schedule Revised on Aluminum Scrap

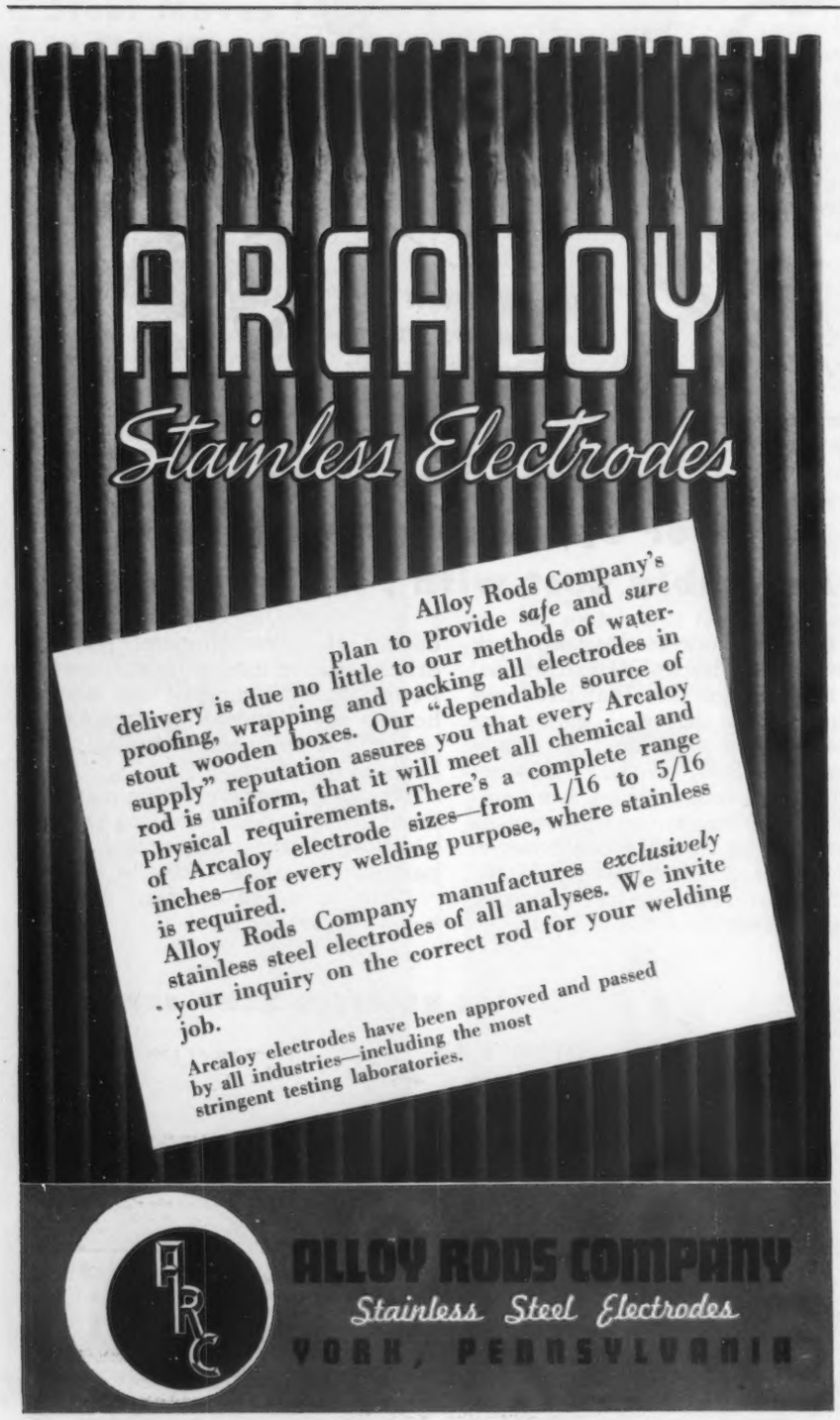
Washington

• • • **A rearrangement** of maximum prices for aluminum "plant" scrap was announced Tuesday by OPM to facilitate the operation of the segregation order, Supplementary Order M-1-d. The maximum prices for plant scrap in carload lots under the schedule as amended are as follows:

Segregated 2s, clips or other 2s solids, 11½c. a lb.; mixed clips or other mixed solids, 10c.; segregated borings and turnings, 9c., and mixed borings and turnings, 8c.

To encourage segregation of scrap, the amendment makes two changes to permit primary producers and secondary smelters to pay premium prices.

1. It eliminates from the schedule all segregated "plant" scrap except pure aluminum, and
2. It establishes a 1c. differential between segregated and unsegregated turnings and borings.



Many Orders for Electrolytic Lines

Pittsburgh

• • • **On the heels of** the pig tin conservation order as it applies to the tin plate industry, it has been disclosed that U. S. Steel Corp. has purchased three electrolytic tin plate lines, Weirton Steel Co. one, and Jones & Laughlin Steel Corp. one. Within the next week or so the following steel companies are all expected to place orders for one line each—Wheeling Steel Co., Republic Steel Corp., Bethlehem Steel Co., Inland Steel Co., and Youngstown Sheet & Tube Co.

Approximately 9 months will be necessary for the completion of the equipment which will be given a high priority rating. The average cost per line is said to be approximately three-quarters of a million dollars including necessary equipment.

At least three specific methods for electrolytic tinning of tin plate are involved in the orders which have already been placed. The capacity of one method is estimated at 40,000 tons of tin plate a year, another one at 45,000 tons a year, and the third at 100,000 tons a year.

The reduction in pig tin allotments to the tin plate industry plus other restrictive measures in tin plate production are said to have contributed to the avalanche of equipment orders. The increase in the use of electrolytic tin plating which requires one-half lb. or less of tin per base box of plate as compared with 1.25 and 1.35 lb. per base box under the present method is expected to make available supplies of tin go much further.

United States Steel Corp., which already has an electrolytic tin plate line under operation at Gary, will place one of the new lines probably at the Irwin Works, one at Birmingham and one at Gary.

Agreement Reached On Tin Plate Tonnage

Washington

• • • **Approximately** 40,000,000 to 45,000,000 base boxes of tin plate will be allocated by OPM for essential food packing purposes and manufacturers of general line cans will be cut to 50 per cent of the plate used during the first quarter of 1942, using the first three months of 1940 as a base. After March 31, 1942, no tin plate will be available for general line use.

The agreement, to be embodied in an order issued soon, resulted from conferences in the past week between members of the tin plate and canning industries held by OPM with the cooperation of the Department of Agriculture.

The curtailment in the use of tin plate for general line cans may mean a saving of as high as 16,000,000 base boxes in 1942 predicated on the requirements for 1940. However, black plate may be used and if so the saving will be materially cut as there is no priority on black plate.

The estimates do not include flat sheets for lend-lease purposes. OPM officials say they have no idea of the proportion of the cuts to be made but indicate they will follow the general outline of the OPM order when it is issued.

Secondary packing uses, involving such products as fruits, applesauce, cranberries, etc., are to be cut but the industry itself has no idea how much of a saving will be effected.

During 1940, according to figures presented by the Can Institute, 1,300,000 tons of steel were consumed by packers lines and 800,000 tons by general lines.

Freuhauf Buys Plant

Detroit

• • • **The Freuhauf Trailer Co.,** here, manufacturers of commercial trailers, has announced the purchase of the Fort Wayne (Ind.) plant of the Koppers Co. for use in Freuhauf enlarged heavy duty hauling manufacturing program. The plant in Fort Wayne includes a plate shop, warehouse, machine shop, power plant and miscellaneous buildings adaptable to heavy duty construction.

G.M. Adds $700 Million in War Contracts Jan. 1 to 10

Detroit

• • • **War materials contracts** being filled by General Motors Corp. have increased steadily from $960,177,739 in June, 1941, to $1,619,831,219 at the end of Dec., 1941, according to C. E. Wilson, president.

An acceleration of war contract releases in the period Jan. 1-10 has aded $769,330,000 in the form of new contracts and orders, increases, letters of intent and firm commitments, he also revealed. Another $1,368,430,000 in war work is in process of negotiation.

Cumulative deliveries up to Dec. 31 totaled $409,968,046, leaving unfilled orders of that date at $1,209,863,173.



To recondition printing rollers the old rubber must be stripped off and the metal core roughened thoroughly by blasting so that new rubber will adhere properly after vulcanizing. Heretofore the blasting job was costly, it consumed a great amount of time, and it tied-up production.

To eliminate this condition the Samuel Bingham's Sons Mfg. Co., Chicago, large producers of ink rollers, installed an American WHEELABRATOR Special Cabinet in 1939. Small rollers are now being cleaned in 20 seconds that formerly required 20 minutes to process with air blast equipment. Large rollers that required as long as 6 hours to finish are now being handled in 5 minutes. Operation of the machine is continuous—loading being handled at one end of the cabinet and unloading at the other.

While you may not be confronted with a problem exactly like this, it is quite possible that you do have one of an equally difficult nature. If so, be sure to get a WHEELABRATOR demonstration and see for yourself how this modern, speed-cleaning process will give you faster production at lower cost.

TRADE MARK
THE AMERICAN MOLDER

AMERICAN FOUNDRY EQUIPMENT CO.
510 S. BYRKIT ST. MISHAWAKA, IND.

. . . it will be a hard war. That is the basis on which we now lay all our plans. That is the yardstick by which we measure what we shall need and demand . . . money, materials, *doubled and quadrupled production—ever increasing . . .*

from President Roosevelt's Address Tuesday, December 9th, 1941

Need Help to Hit This New Tempo?

Multiplied production means multiplied problems—with less time for experimenting. Why not answer your steel puzzles *faster* with Frasse Technical Service?

Production bothering you? Let Frasse engineers help you find a better steel or speedier method! Blocked by shipping "promises"? Let Frasse Technical Service try to find you an easier-to-get substitute! Priorities? You needn't be confused — Frasse can give you up-to-the-minute information at once!

If it's reference data you need, Frasse can provide it aplenty—calculators to simplify heat treatment, fabricating and design handbooks, and a *new* data chart file specially designed for mechanical steel users. (The latest addition shows a short cut system for figuring tubing weights. It's yours for the asking.)

Whatever your steel problem, Frasse engineers will help you unravel it faster. They're competent (the letter below is one of scores open to inspection)—and their services are "on us". *Call Peter A. Frasse and Co., Inc., 17 Grand Street, N. Y. C. (Walker 5-2200) • 3921 Wissahickon Avenue, Philadelphia (Radcliff 7100) — (Park 5541) • 50 Exchange Street, Buffalo (Washington 2000) Jersey City, Hartford, Rochester, Syracuse, Baltimore.*

"Some letters are unpleasant and some are very pleasant to write. It is a pleasure to write this and to thank you for your efficient service and your complete cooperation in getting us out of our machining difficulties.

Frankly, if your Mr. Van Horn had not come down, we would have had to turn down a fairly good sized contract in conjunction with the Defense program."

Sincerely yours, W. K. Slatford

JOHN CHATILLON & SONS, W. K. SLATFORD, *Purchasing Agent*

FRASSE STEELS

Frasse Technical Service

TO AID YOU IN PROCUREMENT, DESIGN, AND PRODUCTION PROBLEMS INVOLVING MECHANICAL STEELS

Frasse Mechanical Steels

SEAMLESS STEEL TUBING • WELDED STEEL TUBING
SAE ALLOY STEELS • STAINLESS STEELS • DRILL ROD
COLD ROLLED STRIP AND SHEETS • COLD FINISHED BARS

New Order Covers Machine Tool Making

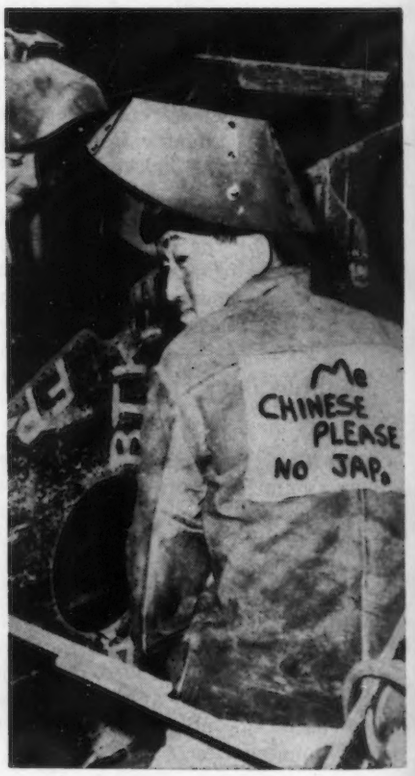
Washington

• • • **OPM's division of priorities** on Tuesday issued a new order covering production and distribution of machine tools, gages and chucks. Known as General Preference Order No. E-1-a, it becomes effective on Thursday of the present week. The order will replace Supplementary Order No. 1 to General Preference Order E-1, which has covered machine tool deliveries. The new order was originally issued Jan. 6, to become effective Jan. 10 but was suspended pending revision.

The new order contains only minor changes in substance from the previous orders, but is accompanied by a new master numerical preference list which will take

BEAT THE JAPS: This Chinese welder on the Pacific Coast is doing his part to lick the Japs and their Axis partners. Howard Yip of the California Shipbuilding Corp., at Wilmington, Cal., is doing his bit to build America's "Victory Fleet" and to make sure no one mistakes him for Jap he wears a sign on his back.

INS Photo



OPM Warns Against Discharging Aliens

Washington

• • • Branding the discharging or refusal to hire employees because they had foreign-sounding names as stupid and unjust, OPM's labor division has pointed out that such practices engender the very distrust and disunity on which "our enemies are counting to defeat us."

There is no law prohibiting the employment of aliens, it was stated, except in special defense work of a secret nature and even in such work the employer may hire an alien with the permission of the Army or Navy, depending upon the contract.

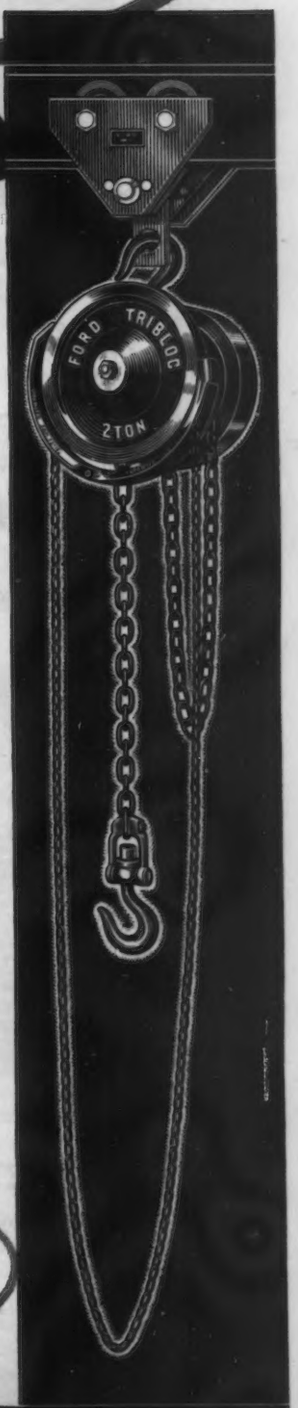
Thousands of British, Norwegian, French, Polish Dutch and other nationals of the United Nations and of neutral countries are currently employed in plants turning out war materials, it was pointed out. Aliens who might endanger the war program have already been taken into custody by the Federal authorities, it was said.

effect 30 and 60 days after Jan. 15, depending upon the type of machinery involved. This list is restricted and will not be made public, but copies will be sent to all manufacturers of machine tools, gages and chucks, together with a copy of the new order and an explanatory letter. By referring to this list, machine tool, chuck and gage makers can determine how to schedule deliveries to fill the orders on their books when they are unable to meet all delivery dates in accordance with preference ratings.

Gages and chucks will be brought under the same complete priority control as machine tools by the terms of General Preference Order E-1-a, revised. The revised master preference list will make changes in the urgency standing of machine tool requirements of war contractors in accordance with new circumstances and the needs of the war program. Other changes effected by the order consist of clarification of the operations of preference ratings and urgency standings. A copy of the revised master preference list arranged alphabetically is now being prepared for the convenience of manufacturers and will be sent to them as soon as it is ready.

"KEEP GOING" IS AS IMPORTANT AS "GET GOING"

FORD Triblocs Help



Production schedules are up. Thousands of plants have a back log of orders. American industry is under way for national defense. Now it is a matter of *keep* going. The **FORD TRIBLOC SPUR-GEAR HOIST** is a tool that can help you maintain your production schedules.—Because they are fast in operation—because they are on the job constantly, ready for instant use.

Triblocs are also directly saving countless dollars for these users. Because their first cost is low—and they are maintained at a minimum of expense.

The **FORD TRIBLOC** is a quality spur-gear hoist. It is made throughout of high grade drop forgings and malleable castings of certified grade. Its Acco High Carbon Heat Treated chain has great strength and high elastic limit. **FORD HOISTS** must stand a 50% overload test before shipment.

Write for information on Triblocs in ¼-ton to 40-ton capacities.

Order from your distributor

FORD CHAIN BLOCK DIVISION
PHILADELPHIA, PENN.

In Business for Your Safety

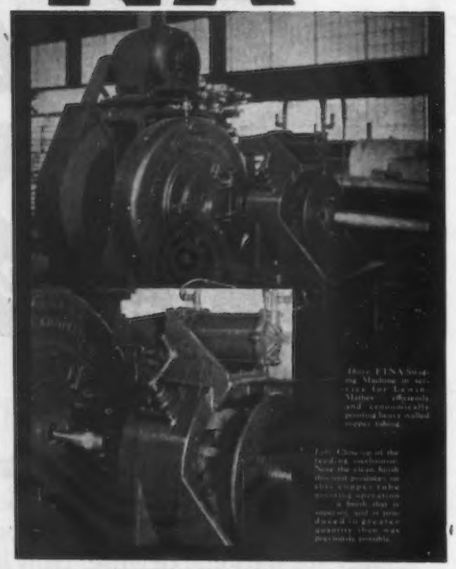
ACCO

AMERICAN CHAIN & CABLE COMPANY, Inc.

LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.



The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

PERFORATED METALS
INDUSTRIAL • ORNAMENTAL



ANY METAL • ANY PERFORATION

Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO, ILL.
New York Office, 114 Liberty Street

Book on Arc Welding Published by Hobart

• • • **A textbook on "Practical Arc Welding,"** by W. J. Chaffee, has been published by the Hobart Trade School, Troy, Ohio. Intended for the use of both beginners in welding as well as technical men, the volume contains 516 pages and 512 illustrations. It sells for $2 postpaid in the United States.

Part I in the book is devoted to general welding information. Material covered includes the growth of arc welding; where arc welding is used; manufacturing applications; available metals and alloys; discussion of joints and welds; electrodes and filler rods; strength of arc welded joints; cost of arc welding; characteristics of the welding arc; welding symbols and their use; equipment for arc welding; development of welding personnel.

Parts II and III of the textbook are devoted to the complete series of 41 arc welding lessons as they are offered in the Hobart Trade School. Parts IV and V contain a dictionary of welding terms and 20 pages of helpful tabular data for operators and designers.

Steel Construction Code and Specification Books Revised

• • • **The American Institute** of Steel Construction announces revisions and new editions of "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings," revised July, 1941; and "Code of Standard Practice for Steel Structures other than Bridges," revised August, 1941. Copies of either document may be had for 10c. from the American Institute of Steel Construction, 101 Park Avenue, New York.

Wyckoff to Get Navy "E"

Pittsburgh

• • • **Wyckoff Drawn Steel Co.,** with plants at Ambridge, Pa., and Chicago, has been notified that it is to receive the Navy "E" pennant and the flag of the Bureau of Ordnance for outstanding effort in the production of ordnance material. The entire capacity of the company is devoted to armament materials and products for essential industries.

Aluminum No Longer In Army Mess Kits

Washington

• • • **In an effort to conserve aluminum for use in airplane production, the Army mess kit is destined to undergo a change, the first since 1932. The mess pan, called the meat pan by the Army, and the cup will be made of stainless steel, and the knife will have a plastic handle instead of cast aluminum. The fork and spoon, formerly made of nickel-silver will be steel.**

Book on Blueprint Reading For Welders Revised

Cleveland

• • • **The second edition** of "Simple Blueprint Reading with Special Reference to Welding" has been published by the Lincoln Electric Co. More than half the 96 illustrations in this 146-page volume have been revised from the first edition. The text gives the student an understanding of symbols used in drawing various types of welded joints, and the illustrations include practical examples of many types of welded structures. The book also covers the essentials of general blueprint reading. It sells for 50c. postpaid in the United States, 75c. elsewhere.

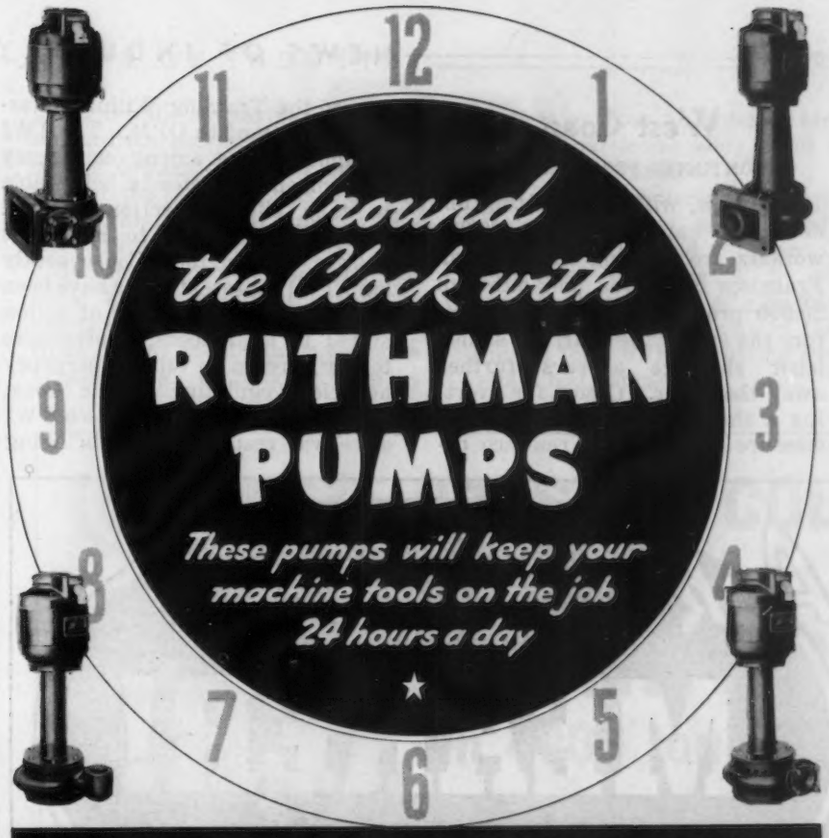
Regional OPA Offices Set Up in Boston and Atlanta

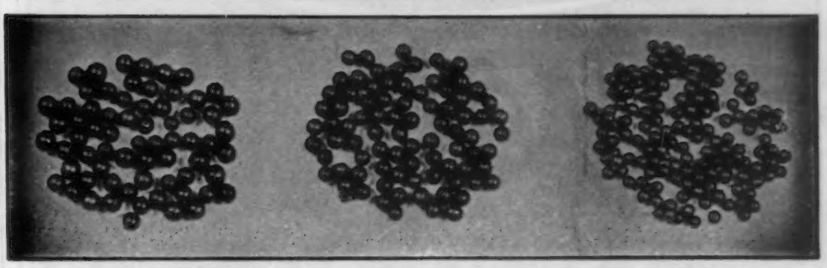
Washington

• • • **OPA has established** regional offices in Atlanta, and Boston, with Oscar R. Strauss, Jr., in charge of the former, and Kenneth B. Backman in charge of the Boston office. Mr. Strauss was formerly vice-president of a department store chain and Mr. Backman was manager of the Boston Better Business Bureau.

McKenna Metals Lowers Prices

• • • **The McKenna Metals Co.,** Latrobe, Pa., has announced a price reduction in Kennametal tools and tool blanks effective Jan. 5. A five-fold increase in production in 1941 permitted a reduction of 20 to 30 per cent in the sizes of blanks customarily required for steel-cutting lathe and boring tools. A new price list is obtain-





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We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

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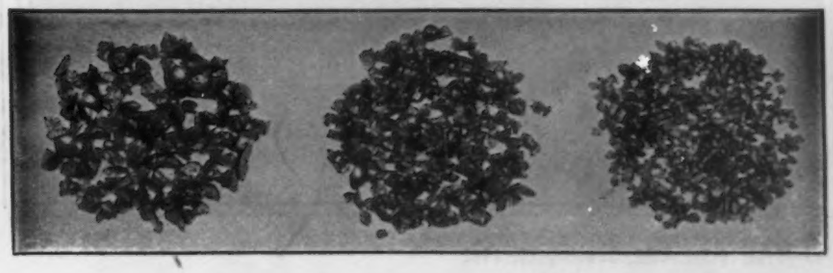
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



West Coast

(CONTINUED FROM PAGE 60)

1942. Now, with 1942 getting under way approximately 60,000 workers are building ships in San Francisco Bay yards, and, although 20,000 probably will be added before the end of the year, the skilled labor shortage appears further away than ever. Credit for averting a shortage goes in very great measure to the San Francisco office of the Training Within Industry Division of th OPM. The TWI is almost alone among emergency government agencies in being able to take effective action without referring every detail to the marble halls of Washington. Consequently local TWI representatives have been able to formulate courses of action suited to local needs, a procedure totally foreign to other emergency agencies regulating Pacific Coast business. The San Francisco TWI office was responsible for bringing together representatives of the shipyards and the AFL Bay Cities Metal Trades Council (IRON AGE, Oct. 23, 1941) to work out a program by which shipyard apprentices might be trained in any of the skills in which a labor shortage threatens. Up until last week, this unprecedented employer - union accord has resulted in the training of 3567 men in Bay area shipyards, with the program rapidly gaining momentum. In addition to this number, 2346 were taking pre-employment training and 4532 were taking supplementary training in the Bay region.

Complementing these courses, 506 men have gone through job instructor training since the middle of November. This is the program by which supervisors, foremen, and experienced workers are taught how to train and break in new men efficiently.

In San Diego, more than 1000 key aircraft workers started job instructor training last week, and more than 6000 through the state will be trained during the next few months.

IT now looks as though the chief labor rub on the Pacific Coast would be in agriculture. Statistics show that migrant Okies and Arkies are either going to defense industries or are returning to their Midwestern farms, made attractive once more by higher farm prices. Since the declaration of war, the exodus has been accentuated. Growing and harvesting of specialty crops requiring a large labor supply may be severely affected, particularly in view of limitations on the manufacture of labor - saving farm equipment.

Higher unit prices which the Metals Reserve Co., RFC subsidiary, has announced it will pay for manganese, chrome and tungsten ores, and their acceptance of these ores in smaller lots, already has resulted in increased activity. The price rise seems to be particularly effective in stimulating tungsten production and it now appears that the loss of foreign ores for this metal will be felt less than loss of chromite and manganese imports. Grades set for chromite still appear too high to allow utilization of most domestic ores under the present price structure. The same seems to be true for most far Western manganese.

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Alabama Drive Aims at Wider War Effort

Birmingham

• • • A **"direct aid program"** aimed at bringing Alabama industry into broader participation in the nation's war effort has been inaugurated by the Alabama State Chamber of Commerce, in conjunction with the State Department of Industrial Relations.

The drive has been started as a further move to prevent plant shutdowns resulting from shortages of raw materials, and T. C. Reid, state chamber field representative, and William H. Ivey, manager of the division of labor, state industrial relations department, have begun a tour of the state to visit plants which have reported difficulties in obtaining raw materials.

Problems of these plants will be studied at first hand and referred to the state chamber defense advisory committee, which will work with the OPM office here in seeking means of ironing out the difficulties.

W. A. Steodman, state chamber president, said many plants in Alabama have not yet been able to switch over to defense work. A standard formula for assisting industries with a threatened shortage of raw materials cannot be found, he added, and a first hand study of individual plant problems was found necessary to bring all strata of Alabama industry to maximum defense production.

New Instrument for Alloy Check-Analyses

(CONCLUDED FROM PAGE 36)

for the duration of the test. For most purposes, the time required will be about 1 min. If the galvanometer indicates the presence of a thermo-electric current, it is certain that the "test" sample and the "reference" sample are dissimilar, but if it remains at the zero setting, the samples will represent identical materials.

Exhaustive tests on common ferrous alloys are said to have demonstrated that the Identometer is unfailingly consistent in detecting even minute differences between alloys. For example, two samples of seven element alloys were tested, both having been reported by chemical analysis as having the same composition except that in one the copper content was 0.05 per cent and in the other it was 0.22 per cent. This relatively small variation was detected immediately.

Such accuracy is particularly valuable, since present check analysis practice is to determine the quantities of only two or three elements present in alloys ranging to eight elements or more, in order to identify that particular alloy as to its proper "heat" number.

To extend the versatility of the Identometer, it is possible, with the use of a jig and two specially constructed attachments, to conduct non-destructive tests on bars, sheets, billets, ingots, etc., in their original form without cutting away special test samples.



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

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PERSONALS . . .

• **Max W. Babb,** president of the Allis-Chalmers Mfg. Co., Milwaukee, has been elected chairman of the board of directors, and **W. C. Buchanan** a director and member of the executive committee has succeeded him as president. Mr. Babb in becoming chairman of the board fills the position formerly occupied by the late General Otto H. Falk, which has been vacant since his death in 1940.

Mr. Buchanan, who is 53 years old, was born in Johnstown, Pa. He worked first for the Cambria Steel Co. at Johnstown in 1904 and by 1912, was in charge of a number of the company's rolling mills and finishing departments. When W. H. Donner bought the New York Steel Co., Buffalo, which later became the Donner Steel Co., Mr. Buchanan was engaged to assist in the rehabilitation of this plant. Then followed a series of important jobs with the American Tube & Stamping Co., Bethlehem Steel Co., and Trumble Steel of Warren, Ohio. After that he went into financing in Cleveland and had a hand in consolidating various steel firms, including Continental, Empire and others. In the early part of 1929 he joined the Keystone Steel & Wire Co. of Peoria, Ill., and was vice-president and general manager of that concern when in 1935 he resigned to take the presidency of the Globe Steel Tubes Co., in Milwaukee, which position he still maintains.

Mr. Babb joined the Allis-Chalmers Co., as its attorney in 1909 and has been with the company and its successor, the Allis-Chalmers Mfg. Co., since that time. From 1913 to 1932, he was the sole vice-president of the company and in 1932 he became its president.

• **Henry A. Roemer** has been elected chairman of the board, Pittsburgh Steel Co., Pittsburgh, but while relinquishing the office of president, he will continue as chief executive officer of the company. **Joseph H. Carter** who has been operating vice-president, was elected president. **Albion Bindley,** formerly vice-president of the company, has been elected executive vice-president. Mr. Roemer, in addition to his executive direction of the Pittsburgh Steel Co., is chairman and president of the Sharon Steel Corp., Sharon, Pa. He was elected president of Pittsburgh Steel in January, 1936. Mr. Carter who was works manager of Sharon Steel in 1936, was made general superintendent of Pittsburgh Steel in March of that year and subsequently was made operating vice-president of Pittsburgh Steel and Sharon Steel Corp.



MAX W. BABB, chairman of the board, Allis-Chalmers Mfg. Co., Milwaukee.

• **Dean Rollans** has been elected vice-president in charge of sales of the Wickwire Spencer Steel Co., New York. Mr. Rollans joined the Wickwire Spencer company in 1928 as district credit manager and wire rope sales representative in Tulsa, Okla. In 1930 he was transferred to the company's Worcester, Mass., office where he remained until 1941 when he was transferred to the company's headquarters in New York as general sales manager. He is a member of the Wire Products Subcommittee of the Iron and Steel Defense Advisory Committee to the OPM.

William H. Husted, who joined Wickwire Spencer in 1941, was named assistant to the president. In addition to his duties as assistant to the president, Mr. Husted will be given leave of absence for three days a week to serve as consultant to the raw materials division, Iron and Steel unit of OPM.

• **George B. Beitzel,** former manager of sales, has been promoted to vice-president in charge of sales of the Pennsylvania Salt Mfg. Co., Philadelphia. Mr. Beitzel joined the Pennsylvania Salt Mfg. Co. 12 years ago.

• **J. Rogers Davis** has been named supervisor of branches, a newly created office of the Chicago Pneumatic Tool Co., New York. Mr. Davis joined the company in December and will assist in the sales activities of Chicago Pneumatic's 21 district and sub-district offices. He will standardize sales office procedure and coordinate sales plans and quotas with branch and division Managers.

• **L. W. Grothaus,** vice-president of the Allis-Chalmers Mfg. Co., Milwaukee, has resigned. He was with the firm 37 years, having started in the Norwood shop, later becoming district sales manager at Minneapolis and Cleveland. In 1925 he was made assistant manager of the electrical division at Norwood and later was in the same capacity at Milwaukee. He became general representative in 1931, assistant to the president in 1933 and vice-president in 1936.

• **Bruce R. Allen** has been named to the OPA Iron and Steel Section. He has been with the government since 1931 as special agent (accountant) with the FBI and as a fiscal accountant in other agencies.

• **M. J. Healey,** Kansas City, has been appointed to the OPA farm equipment unit of the machinery section. Mr. Healey, formerly was a director of Deere & Co., and John Deere Plow Co.

• **Ralph H. Deihl** has been appointed advertising manager of the Falk Corp., Milwaukee. Mr. Deihl was graduated from the Commerce School of the University of Wisconsin in 1936 and spent two years in the advertising department of the Bucyrus-Erie Co. and two years in the advertising department of the National Enameling and Stamping Company, both of Milwaukee. He joined the Falk Corporation in May, 1940, and has been handling the advertising of the company since that time.

• **Bert M. Brock** has been appointed manager of industrial

relations for the John A. Roebling's Sons Co., Trenton, N. J. Mr. Brock for the past year has been director of industrial relations, Pittsburgh district, Carnegie Illinois Steel Corp., and prior to that was assistant director of industrial relations for the U. S. Steel Corp. of Delaware, Pittsburgh, Pa. Previously, he was manager of industrial relations for the Columbia Steel Co. at San Francisco.

• **F. H. Lindus** has been named by the Timken Roller Bearing Co., Canton, Ohio, to sales promotion work. A graduate of the University of California, he has been with the Timken company since 1935, serving as Los Angeles branch manager of the service division until he was transferred to the main office at Canton a few months ago.

• **W. L. Kennicott,** previously Los Angeles sales manager of McKenna Metals Co., Latrobe, Pa., in the management of sales and engineering of Kennametal tools and their applications.

• **Thomas E. Hughes,** superintendent of maintenance, Carnegie-Illinois Steel Corp., Duquesne, Pa., has been elected president of the Association of Iron & Steel Engineers, Pittsburgh. Mr. Hughes has spent his entire business background in the steel industry. He started to work with the Union Railroad in 1902 and successively worked at the Clairton plant of Carnegie-Illinois Steel Corp., McKeesport plant of National Tube Co., Youngstown plant of the Youngstown Sheet & Tube Co., and for the past 29 years has been at the Duquesne plant of Carnegie-Illinois.

• **Dana Chase** has been appointed general sales manager, Chicago Vitreous Enamel Product Co., Cicero, Ill. Mr. Chase has been associated with the company for the past 12 years and formerly held the position of assistant to the vice-president and general manager.

• **George P. Passmore** has been named works manager in charge of manufacturing of the Wellsville works, of the Worthington Pump & Machinery Corp., Harrison, N. J. Until recently Mr. Passmore has been manager of manufacturing of the South Philadelphia works of the Westinghouse Electric & Mfg. Co., having been connected with the Westinghouse organization for 20 years in various responsible capacities.

• **Horace Bassett** of the Wolverine Tube Co., Detroit, has been promoted to the position of factory manager.

• **F. J. Carr** has been elected vice-president, finance, of American Steel & Wire Co., subsidiary of U. S. Steel Corp., Pittsburgh. At the same time, **C. S. Morris** has been appointed supervisor of accounting and **Ogden Ashley,** assistant to the comptroller since 1941,



F. J. CARR, vice-president, finance, American Steel & Wire Co., Cleveland.

has been made assistant to vice-president, finance. Mr. Carr's association with American Steel & Wire began in March, 1938, when he was appointed to the post of assistant to the president. The following October he was named comptroller of the company. Prior to becoming associated with American Steel & Wire, Mr. Carr served for four years as comptroller of the Tennessee Valley Authority at Knoxville, Tenn. Previous to that he had been comptroller of Aviation Corp., after having held a similar position with Hahn Department Stores. Mr. Morris has been associated with the wire company since October, 1907, when he began as a typist in the invoice department. He worked his way up through the ranks until being made assistant auditor in July, 1936. In July, 1941, he was named supervisor, general accounting.

• **M. V. Kehoe,** associated with the Hall Mfg. Co., Cedar Rapids, Iowa, for close to 40 years, has retired because of ill health. Mr. Kehoe joined the ranks of the J. S. Hall Hardware store at Monticello, Iowa, in 1900. When the Hall Mfg. Co. was organized in 1908, he became secretary. In 1919 the plant was established at Cedar Rapids, and following Mr. Hall's death in 1924, Mr. Kehoe held the position of general manager, secretary and treasurer—and served in that broad capacity until a few years ago.

• **John H. Lawrence** has been appointed manager of the coal department of Cleveland Cliffs Iron Co., Cleveland.

• **John H. Davey,** who has been connected with the Chicago office of the Brown & Sharpe Co. for a number of years has retired after 46 years of active service in various capacities with the Brown & Sharpe Mfg. Co. and its subsidiary, Brown & Sharpe Co.

• **J. Harry Jackson** has been appointed a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to research in metallurgy. A graduate of Rensselaer Polytechnic Institute, Mr. Jackson was associated with the Caterpillar Tractor Co., Peoria, Ill., as metallurgist and welding engineer for five years prior to joining the Battelle staff.

John G. Kura has been named to the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he has been assigned to metallurgical research. Before joining the Battelle staff he was associated with the Carnegie-Illinois Steel Corp. at Duquesne, Pa.

Charles A. Reichelderfer has joined the research staff at Battelle Memorial Institute, Columbus, Ohio, where he has been assigned to the division of non-ferrous metallurgy. Prior to joining the Battelle staff, Mr. Reichelderfer was associated with the Jones & Laughlin Steel Corp., Pittsburgh.

• **James B. Hayden** has been elected vice-president in charge of sales of the Industrial Brownhoist Corp., Bay City, Mich.

• **James E. Holmes** has been named as assistant manager of

tubular sales of the Youngstown Sheet & Tube Co., with headquarters at Youngstown, Ohio. Mr. Holmes was formerly associated with the Republic Steel Corp. in Cleveland.

• **K. R. Beardslee,** sales manager, will head the centralized sales engineering department of Carboloy Co., Inc., Detroit. Simultaneously two posts of assistant sales manager in charge of this activity have been created. **Martin Muhling,** former special engineering executive and **Earl Glen,** formerly Carboloy Pittsburgh representative, have been appointed to the new posts. **R. R. Preston,** formerly superintendent of the wire mill at Page Steel & Wire Co., succeeds Mr. Glen in Pittsburgh.

• **Judson F. Stone,** for many years a director of the International Harvester Co., has been elected chairman of the board of the company, succeeding the late Harold F. McCormick. At the same time, the board of directors elected **J. I. McCaffrey,** hitherto vice-president in charge of sales, a director and also elected him second vice-president of the company.

Mr. Stone's election as chairman of the board of the Harvester company is the culmination of 50 years of association with the company and the McCormick interests. He first entered the farm equipment business in 1892 in the repair department of the Minneapolis branch of the old McCormick Harvesting Machine Co., a predecessor of the present Harvester company. Mr. McCaffrey, as second vice-president of the company, will continue to exercise direct supervision over its sales activities and in addition will be active in the general administration of the company.

• **Samuel E. Bool,** director of several Pickands, Mather enterprises and also of the Great Lakes Towing Co. and other Cleveland companies, has retired. Mr. Bool originally was connected with the Minnesota Iron Co., which was absorbed by Pickands, Mather & Co. in 1887, and he has been with the latter concern ever since.

• **William H. Ford** has been made plant superintendent of the Martin Bradley Co., Springfield, Mass., primarily game and metal toy manufacturers, but now engaged largely on munition work. Mr. Ford was graduated from the local high school and thereafter has spent the remainder of his life in machine shop work at various plants, becoming associated with the Martin Bradley Co. 16 years ago.

• **R. A. Barr** has been appointed district sales manager in the Chicago territory for the Refractory division of the Carborundum Co., Perth Amboy, N. J. Mr. Barr formerly represented the company in the Cleveland district and recently has been sales promotion manager of the division. He takes the position recently vacated by **R. A. Beverley.**

• **K. W. Jappe,** director of purchases of Hercules Powder Co., Wilmington, Del., has been elected chairman of the finance committee of the American Society of Mechanical Engineers at a meeting of the committee held at the New York offices of the society.

• **Walter Geist,** vice-president of Allis-Chalmers Mfg. Company, was elected a director of York Ice Machinery Corp., York, Pa.

• **Joseph Klotz,** Chicago, has been appointed to take charge of the engineering department of the Brillion Iron Works, Brillion, Wis.

• **Homer R. Mitchell,** president of the Buckeye Portable Tool Co., Dayton, Ohio, since 1933, has been elected chairman of the board. Replacing Mr. Mitchell as president is **Melvorne J. McCombs** who has been associated with the company since 1936. Three months after joining Buckeye, Mr. McCombs was elected vice-president and general manager.

• **A. J. Prance** has been elected president of the Murchey Machine & Tool Co., Detroit. Other officers include: **M. C. Murfin,** vice-president; **W. C. Beechner,** secretary; **J. N. Lord,** treasurer, and **A. W. Byrum,** assistant secretary.

• **C. D. Jacobson** has severed his connection with the David J. Joseph Co. to organize the C. D. Jacobson Corp., 1501 Commerce Building, Houston, Tex. Besides Mr. Jacobson as president, the officers include **C. J. Jacobson** as vice-president and **Richard H. Nathan,** secretary-treasurer.

• **Joseph C. Elliff** and **George L. Meyer** have been elected vice-presidents of the Stewart Warner Corp., Chicago. Mr. Elliff will continue to serve as assistant general sales manager, at the same time assuming new responsibilities. Mr. Meyer has been manager of the Stewart Die Casting Co., a subsidiary, since 1939 but has been associated with Stewart Warner since 1907, when the company was founded.

• **Benjamin F. Ellis** of the Waltham Machine Works, Waltham, Mass., has retired because of ill health.

• **M. B. Antrim,** until August, 1941, sales engineer in the Steel Mill division of Westinghouse Electric & Mfg. Co., Philadelphia, has joined Lukens Steel Co., Coatesville, Pa., as assistant to the electrical superintendent. Mr. Antrim was graduated from Rensselaer Polytechnic Institute, Troy, N. Y., in 1938 with the degree of Bachelor of Electrical Engineering. The same year he joined Repp & Menzies, construction engineers, Scranton, Pa., as draftsman and designer. In 1939 he entered the employ of the Westinghouse company and was located in their East Pittsburgh, Pittsburgh and Sharon, Pa., plants. He was transferred to Philadelphia in January, 1940.

• **John A. McCone** has been appointed vice-president in charge of operations of California Shipbuilding Corp., Los Angeles. Succeeding him as general manager is **Jerome K. Doolan,** former assistant general manager. **Albert O. Pegg,** has joined the firm as manager of ship outfitting, and **J. S. Sides,** former assistant to the production manager, has been named manager of the hull department. **Eddie Molloy,** works manager for Ryan Aeronautical Co., San Diego, has been elected vice-president in charge of manufacturing.

• **S. P. Flenniken, Jr.,** formerly district manager of the Indianapolis office of the Berger Mfg. division of Republic Steel Corp., Canton, Ohio, has been made branch office manager in Chicago for the company. He succeeds **William A. Harris, Jr.,** who leaves to become associated with his father in the pottery business in Liverpool, Ohio. **Allen C. Rudy** of the Chicago sales staff of Berger will succeed Mr. Flenniken as the district manager of the company's Indianapolis office.

OBITUARY . . .

• **Walter L. Marr,** the first chief engineer of the Buick Motor Car Co. and said to be originator of the valve-in-head engine design, died recently in a hospital in Chattanooga, Tenn., aged 76 years. Mr. Marr was born in Lexington, Mich., and at 17 began his career as an apprentice machinist. In 1887 he worked for a saw mill and steamboat engineers in Saginaw and in 1896 he started his own business, a bicycle shop in Detroit. His first gasoline engine, a single cylinder power plant, was used to provide power in his factory. In 1898 he produced a four-cylinder gasoline motor driven wagon of his own design. Mr. Marr worked on the first two 1901 Oldsmobile runabouts. Later he developed his own Marr Autocar which was exhibited at the Chicago Automobile Show in 1903. Long after his retirement he continued as consulting engineer for Buick.

• **Richard T. Wingo,** pioneer automotive designer and consulting engineer in Detroit and Providence, R. I., died in Detroit recently. He was 70 years old. He was associated with Oscar Beale, pioneer gear specialist in the Brown & Sharpe Co., Providence, and for several years was a designer in England and Germany. He went to Detroit as a designing and consulting engineer for Cadillac Motor Car Co. and left it to organize the Superior Machine & Engineering Co. of which he was president at the time of his death.

• **Henry C. Limbach,** 53 years old, national representative of Riverside Foundry & Galvanizing Co., was killed near Charlotte, Mich. Mr. Limbach formerly was an engineer for Cadillac Motor Car Co. and later was manufacturing engineer at Studebaker.

• **Frank F. J. Ruppel,** who had been master mechanic in the Dodge Brothers motor car plant, died in Detroit recently after an extended illness.

• **Charles W. Stiver,** 70 years old, a Great Lakes shipbuilder, died recently at his home in Saginaw, Mich. He was one of the founders of the former Saginaw Shipbuilding Co. and for many years was secretary-treasurer of the A. W. Wheeler Shipbuilding Co., at Bay City, which built steel vessels.

• **William J. Quimby,** died recently at his home in Marine City, Mich. He was born in Detroit in 1870 and was a sales manager for the Seely Mfg. Co. for 25 years.

• **James C. C. Holding** died suddenly at his home in Forest Hills, Long Island, on Dec. 7, from an attack of angina pectoris. Mr. Holding was at various times associated with the American Bridge Co., the Carnegie Steel Co., and the Midvale Steel Co. For several years he was manager of the Stainless Steel Co., at Pittsburgh. At the time of his death he was connected with the New York office of Robert W. Hunt & Co.

• **John F. Hay,** retired Erie manufacturer and well-known in foundry circles, was killed recently. He was 83 years old.

• **W. J. Hartwig,** 69 years old, president and founder of the Liberty Starter Co., and the William J. Hartwig Electrical Co., a pioneer in electrical devices for the automotive industry, died recently.

• **Charles D. Cutting** died in Detroit, Dec. 16. In Chicago as a young man he attained recognition as a bicycle racer. He was a resident of Jackson, Michigan, from 1910 to 1914 when he manufactured the Cutting car. He had lived in Detroit since 1915 and had been associated with his son, Herbert A., in the Cutting Engineering Co.

• **Arthur Aigeltinger,** vice-president of the American Brake Shoe & Foundry Co., in New York, died in his sleep during the night of Dec. 30. He was 58 years old. Mr. Aigeltinger graduated from Columbia University in 1907, and about a year later went to work for the Manganese Steel Rail Co., holding successively the positions of chief engineer, vice-president, and president. During this period he helped develop the rolled manganese steel helmet used in the first World War. In 1918 Mr. Aigeltinger retired from the rail concern to become vice-president of American Malleables Co., of which he was president from 1922 until its dissolution in 1936. Meanwhile he had been appointed assistant to president of American Brake Shoe in 1929, and was elected vice-president in 1934. Inasmuch as both Manganese Steel Rail Co. and American Malleables Co. were both affiliates of American Brake Shoe and Foundry Co., Mr. Aigeltinger's connection extended over a period of 33 years.

• **Charles Tuttle Clark,** president of the Bay City Foundry Co., Bay City, Mich., died Dec. 27, aged 70 years. He was a native of Cedarville, N. J. For 16 years Mr. Clark had been division manager of an E. I. du Pont de Nemours Co. plant in Bay City and later operated the same plant as owner.

• **William J. Reardon,** president of National Alloys Co., Detroit, died recently, aged 71 years. He was born in Paterson, N. J. From 1903 to 1916 Mr. Reardon was foundry superintendent of the Westinghouse Electric & Mfg. Co., at East Pittsburgh, Pa. During World War I he was in charge of munitions work at the Rome Mfg. Co., Rome, N. J. From 1919 to 1929 he was superintendent of the Detroit foundry of Aluminum Corp. of America. He organized National Alloys Co. in 1921. For a number of years he was associate editor of "The Metal Industry."

• **Lewis Albert Bassett,** president of the Hendrick Mfg. Co., Carbondale, Pa., died at his home in Carbondale, Jan. 2. Going to Carbondale, Pa., in 1878, he went to work as a general utility man with the Hendrick Mfg. Co. In this growing business which he helped develop, he served in various positions until he was made secretary and treasurer of the limited corporation and in 1901 upon the full incorporation of the business became vice-president, and in 1909 succeeded the founder, E. E. Hendrick, as president. In addition, he was president and director of the Clover Leaf Mfg. Co., Honesdale, Pa., and a director of the Lehigh Metals Co., Scranton, Pa.

• **Lamar S. Peregoy,** 54 years of age, president and chairman of the board of the Sivyer Steel Casting Co., vice-president of the Interstate Drop Forge Co., both of Milwaukee, collapsed and died suddenly Jan. 2. His death followed by a day that of his brother, **Benton B. Peregoy,** a sales representative for Moe Brothers Milwaukee Co., aged 59 years.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Portable Power Tool Makers Asked to Freeze Prices

Washington

• • • **Approximately 120 manufacturers** of portable power driven tools have been requested by OPM not to raise their net sales prices above those prevailing on Oct. 1, 1941. The manufacturers also have been asked to meet representatives of OPA for discussion of a program of price administration in Washington on Jan. 17. The conference will be held at 9:30 a.m. in the sun parlor of the Hotel Washington, 15th Street and Pennsylvania Avenue.

Letters sent to members of the industry point out that compliance with the request to refrain from price increases would make a substantial contribution to the effort to avert inflation and price spirals that would undermine the effectiveness of the war effort.

Plan for Increased Output

Chicago

• • • **The steady flow** of new machine tool orders is swelling larger here. Though THE IRON AGE voluntarily refrains from naming specific war items for which new machines are being purchased, it can be said that Link-Belt, Oliver Farm Equipment, International Harvester, Studebaker and Buick are among the leaders who are preparing for increased war production. In addition, equipment for the huge naval torpedo plant has already been planned and much of it has been placed. Though the dollar volume of purchases has not been revealed, a rough idea can be obtained from the fact that the plant will employ about 8000 and has been set at a high production schedule from the start. Actual construction of the plant will start any time—but machine tool needs have been discussed with manufacturers for some time and are well known to the industry.

There are reports that Buick has been ordered to practically double its output of aircraft engines which means that its enormous purchases of machine tools will almost be repeated again. It is understood that other engine plants in this area will get sharp step-ups too. With the Ordnance district here making it clear that this section will be headquarters for shell and allied ordnance items to the tune of about $1,500,000,000 —the orders for machine tools will continue to come out steadily.

Oct. 1 Price Ceiling Asked For Machine Tools

Cleveland

• • • **It is reported that** the price conference held in Washington between machine tool representatives and the OPA has resulted in a general ruling for the establishment of prices as of Oct. 1, 1941, on standard machines. Prices on machines for delivery in 9 months or longer period will be subject to an escalator clause. However, any attempt by machine tool builders to increase prices will have to be first approved by the OPA, which probably will base its judgment upon its own interpretation of what an "adequate return" is warranted in each individual instance. Meanwhile, subcontractors working for machine tool builders are allowed such generous margins that their profits are more or less unlimited, and any demands that subcontractors may place upon machine tool builders would place the latter in a difficult position of holding off the subcontractors for a decision until negotiations with Washington for price adjustments have been completed.

It is rumored that Washington would like to have from two to three billion dollars worth of machine tools during 1942 from the industry. Naturally any such ambitious program would necessitate substantial further expansion and the employment and training of a large number of unskilled workers. This makes the industry increasingly dependent upon those skilled men which it now has, so that any losses due to the drafting of men by the armed forces will complicate the industry's production problems considerably.

Large numbers of shell and bomb contracts are in the offing and Washington has held conferences with various industry men concerning the possible construction of entirely new plants, installation of considerable equipment, and the employing and training of complete staffs of personnel to handle large war contracts. The automobile industry is rumored to be the future recipient of important shell contracts.

Rumors concerning the possible large scale entry of the automobile industry into the field of machine tool building probably find origin in the fact that General Motors is now building a planer, and that the company recently began to work on production of a boring mill. Whether or not this equipment will stand favorable comparison with the output of experienced machine tool companies is a moot question for the present.

OPM Sets Up Grand Rapids Office, Moves Detroit's

Detroit

• • • **A branch office** of the Division of Contract Distribution, OPM, has been opened in Grand Rapids, Mich., in the Michigan National Bank Bldg. George A. Dimmer, production engineer, will be in charge and Joseph V. McQuillan has been assigned to the office by the priorities division.

On Jan. 12, the Detroit office was moved to the Boulevard Bldg., bringing under one roof the Divisions of Contract Distribution and Priorities, and the Training Within Industry branch.

1941 Lakes Shipments Reaches All-Time High

Chicago

• • • **All time record** of 169,020,975 net tons of bulk freight traffic on the Great Lakes was set in 1941, according to the Lake Carriers Association. Combined tonnage of iron ore, coal, limestone and grain, bulk freight, increased 18.3 per cent. Tonnage by commodities for 1941 was: Iron ore, 89,730,323; bituminous coal, 49,733,234; anthracite, 536,490; limestone, 17,633,448; grain, 11,387,480.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Premiums Set For Increased Production

• • • **In an effort** to increase production of zinc, lead, and copper, it was announced in Washington this week that premiums for output in excess of that of last year would be paid producers. In a letter to OPM and OPA, Jesse Jones, Federal Loan Administrator, stated that MRC would, for a period of two and one-half years from Feb. 1, 1942, pay 11c. a lb., East St. Louis, for zinc; 9¼c. a lb., New York, for lead; and 17c. a lb., Connecticut Valley, for copper; for increases above 1941 production governed by quotas fixed by OPM and OPA.

These premium prices are also understood to apply to mines that were not operated in 1941 and to new mines, but will not apply to production already arranged for by specific agreement. Consideration will also be given to a longer purchase agreement than two years where the expansion of facilities is necessary. Details of the plan and quotas for individual producers will be announced within a short time by OPA.

Following closely on the heels of the copper and tin conservation orders, OPM this week issued rigid restrictions on the civilian use of lead. Details of this order are included on page 74.

Lead and tin scrap were placed under full priority control by OPM General Preference Order M-72, covered in detail on page 74.

In an effort to keep a constant flow of copper and copper alloy scrap flowing into war industries, OPM revised order M-9-b, providing that no deliveries of copper or brass scrap may be made except to a scrap dealer, or, in the case of brass mill scrap, to brass mills, without OPM authorization. Details of this order are given on page 75.

The zinc industry ended the year with quite a flourish, establishing in December a new production record of 78,635 tons of slab zinc, bringing the year's total to 864,026 tons produced from domestic and foreign ores. All considered, zinc production during 1941 has been rather remarkable. This increase in production has been almost entirely from existing units and from expansion of facilities.

Jesse Jones disclosed this week that because of the situation in the Far East, the government plans to enlarge the capacity of the new tin smelter that is just about completed at Texas City, Texas, from 18,000 to 25,000 tons of tin, refined from Bolivian and Malayan ores. Whether sufficient high grade concentrates will be forthcoming from Malaya to bring the quality of tin made from low grade Bolivian concentrates up to qualities needed for the manufacture of tin plate is questionable. Low grade tin made in this smelter will likely find ready markets in the manufacture of solder, brass, babbitts and other alloys. It is believed, however, that little of it will be suitable for the manufacture of tin plate.

The Japanese have captured most of the tin properties in the Far East, having taken French Indo-China, Thailand, Northern Malaya, and the Penang area. Still holding out in this area are the Dutch East Indies.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead, St. Louis[3]	5.70

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $199 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

MARVEL SAWS

LOW COST—HIGH SPEED

MARVEL

MARVEL 4-B shaper action high speed Hack Saw.

Screw-feed. Ball-bearing saw frame. Quick action vise.

Cuts 6" cold-rolled bar in 8 minutes —other sizes in proportionate time.

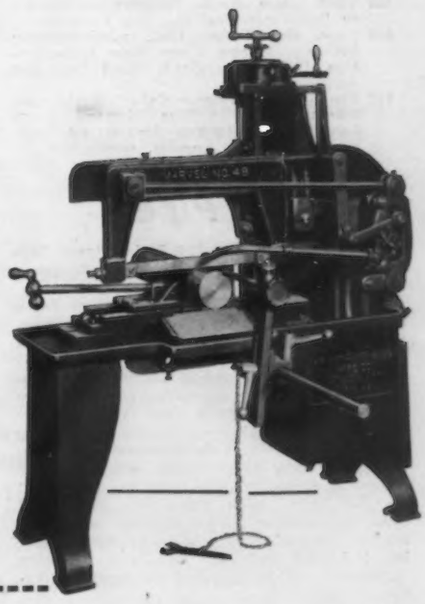
MARVEL

The performance of MARVEL 4-B is high speed cutting with low cost operation because it will out-cut any other saw in its price class. Has draw-cut and lift return giving blade longer life. Has accurate, rigid frame action. 6" x 6" capacity and a speed of 149 strokes per minute. MARVEL 4-B may be had with cabinet base and with 4 speeds.

BUY FROM YOUR LOCAL DISTRIBUTORS

Write for Bulletin about these low cost machines featuring speed and efficiency.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave.
Chicago, U.S.A.
Eastern Sales Office:
225 Lafayette St., New York



Reinforcing Steel

Awards of 55,000 tons; 30,000 tons in new projects.

AWARDS

ATLANTIC STATES

1060 Tons, Cambridge, Mass., housing project, Hold Fairchild Co., contractor, to Bethlehem Steel Co., Bethlehem, Pa.

1000 Tons, Pittsburgh, Pittsburgh Engineering Procurement district, for Army, Panama Canal, to Jones & Laughlin Steel Corp., Pittsburgh.

420 Tons, Atlantic City, beach thoroughfare bridge, Ole Hanson, contractor, to Bethlehem Steel Co., Bethlehem, Pa.

400 Tons, Rhode Island, Cumberland-Lincoln viaduct, to Carnegie-Illinois Steel Corp., Pittsburgh.

230 Tons, Groton, Conn., bridges, A. I. Savin contractor, to Truscon Steel Co., Youngstown.

200 Tons, Harrison, N. J., Crucible Steel Co. of America expansion, to Bethlehem Steel Co., Bethlehem, Pa.

150 Tons, Laughboro, Md., building, Washington Petroleum Products Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

130 Tons, Watertown, Mass., Watertown Arsenal laboratory, to Carnegie-Illinois Steel Corp., Pittsburgh.

100 Tons, Great Bend, N. Y., Mohawk Construction Co., contractor, to Bethlehem Steel Co., Bethlehem, Pa.

THE SOUTH

1800 Tons, Alexandria, Va., Alexandria housing project; Starrett Bros. & Eken, contractors, to Bethlehem Steel Co., Bethlehem, Pa.

1000 Tons, Morgantown, W. Va., ammonia plant for duPont Co., to Jones & Laughlin Steel Corp., Pittsburgh.

126 Tons, Austin, Tex., Southwest Bell Telephone Co., to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

3400 Tons, Alameda, Cal., contractors Pacific Naval Air bases, divided among Laclede Steel Co., St. Louis; Sheffield Steel Co., Kansas City; Jones & Laughlin Steel Corp., Pittsburgh; Inland Steel Co., Chicago, and Carnegie-Illinois Steel Corp., Pittsburgh.

3000 Tons, San Diego, Cal., Naval training station, Marine Base, to Blue Diamond Corp., Los Angeles, through William Simpson Co., Los Angeles, contractor.

1500 Tons, Coram, Cal., Shasta Dam (Invitation A-33,457-A-5), to Republic Steel Corp., Cleveland.

1150 Tons, Odair, Wash., Reclamation Bureau, to Republic Steel Corp., Cleveland.

700 Tons, Los Angeles, Aluminum Co. of America reduction plant, to Truscon Steel Co., Los Angeles.

650 Tons, Odair, Wash., Reclamation Bureau, to Bethlehem Steel Co., San Francisco.

600 Tons, San Diego, Cal., administration building, Marine Corps Base (Specification 10,504), to Soule Steel Co., Los Angeles.

447 Tons, San Diego, Cal., Washington Street bridge, to Blue Diamond Corp., Los Angeles, through Contracting Engineers, Inc., Los Angeles, contractors.

Cast Iron Pipe

● **Milford Water Co.,** 226 Main Street, Milford, Mass., contemplates water main extension on South Main Street, South Milford.

Fall River, Mass., has allotted funds for a pumping station and 42-in. main. Hayden, Harding & Buchanan, Park Square Building, Boston, are engineers.

Newport, R. I., board of water commissioners have plans for approximately two miles water distribution main and will increase capacity of reservoir.

Board of District Commissioners, Washington, plans new 30-in. main supply line in Anacostia Avenue to point near Stevens Road; also for 24-in. main water line in part of same thoroughfare and adjoining streets to Nichols Avenue. A new pumping unit, capacity 10,000,000 gal. per day, and auxiliary equipment will be installed in pumping station at Dalecarlia.

Weekly Bookings of Construction Steel

Week Ended →	Jan. 13, 1942	Jan. 6, 1941	Dec. 15, 1941	Jan. 14, 1941	Year to Date 1942	Year to Date 1941
Fabricated structural steel awards	48,000	16,200	18,700	40,100	64,200	74,000
Fabricated plate awards	0	0	0	0	0	1,500
Sheet steel piling awards	0	0	0	105	0	1,760
Reinforcing bar awards	55,000	62,000	20,000	4,900	117,000	18,945
Total letting of Construction Steel	103,000	78,200	38,700	45,105	181,200	96,205

Water Department, Canton, Ohio, has plans for new 42-in. main line for water system, leading from new 5,000,000,000-gal. reservoir to be constructed, to water treatment and purification plant, and thence to connection with city mains. Entire project will cost $2,100,000, of which $740,400 will be a federal grant and remainder of fund provided by city. John Shisler is city engineer; Havens & Emerson, Leader Building, Cleveland, are consulting engineers.

Bureau of Prisons, Terre Haute, Ind., asks bids until Jan. 19 for cast iron soil pipe and fittings, including sleeves, Y-branches, bends, valves, pipe plugs, etc. (Circular 31-2).

Water Department, New London, Conn., plans about 6000 ft. of 20 to 24-in. pipe for main water supply, with alternate bids to be asked for cast iron, concrete or transite pipe; also, new pumping station, gatehouse, steel standpipe and other waterworks equipment. Cost about $350,000. Financing has been arranged through federal aid. Clarence M. Blair, Inc., 100 Crown Street, New Haven, Conn., is consulting engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, closes bids Jan. 22 for 115,000 ft. of cast iron pipe for Eastern and Western Navy yards (Schedule 9965).

Bremerton, Wash., has taken bids on 5000 ft. of 8-in., 5000 ft. of 6-in., 3500 ft. of 4-in., 3000 ft. of 3-in., and 2500 ft. of 2-in. bell and spigot pipe.

Pipe Lines

● **Humble Oil & Refining Co.,** Humble Building, Houston, Tex., has asked bids for new 8-in. welded steel pipe line from Hawkins, Tex., oil field area, to connection with main trunk line leading to Shreveport, La., close to 22 miles, for crude oil transmission.

United States Engineer Office, Wright Building, Tulsa, Okla., asks bids (no closing date stated) for gasoline fueling system and oil storage system for Air Corps at aircraft assembling plant, now in course of construction on local site, including 4-in. pressure pipe for gasoline supply, gasoline and oil pumping station, unloading platform, four fueling pits, five 25,000-gal. gasoline storage tanks, one 12,000-gal. oil storage tank, three water separator tanks, etc., as per plans and specifications on file.

Public Service Electric & Gas Co., Public Service Terminal Building, Newark, N. J., plans new 24-in. pressure pipe line from West End Gas Works, Jersey City, N. J., to gas holder station at New Durham, N. J., about eight miles, for gas transmission for increased supply to points in Bergen County. This is part of expansion program.

Edinburg, Tex., is holding a special election today, Jan. 15, to approve bond issue of $175,000 for pressure pipe line system for municipal natural gas distribution, including main welded steel pipe line for connection with supply source, meter house, control station and other operating facilities.

Board of Water Commissioners, Springfield, Mass., plans new 50-in. steel pipe line for main water line from Brevin Mountain reservoir to filtration plant at West Parish, about 40,000 ft. Cost close to $1,000,000 with operating facilities. Financing is being arranged through federal aid.

Dallas Gas Co., Dallas Gas Building, Dallas, Tex., has arranged fund of about $30,000 for extensions in pipe lines for gas distribution system and lateral lines for service connections. This is part of 1942 expansion program of company.

Messer Oil Co., Olean, N. Y., plans pipe lines in connection with development of oil properties in Allegany, N. Y., and Bradford, Pa., oil field districts, including pipe line gathering systems and main transmission lines. Also plans steel storage tanks, pumping stations and other facilities.

Auto 7-Man Subcommittee Called Victory for Industry

Washington

• • • **Doubt regarding what** it may accomplish in rapid conversion of the automobile industry to a complete war footing followed the OPM announcement on Jan. 12 of the seven-man advisory subcommittee of industry and CIO members. There was general praise, however, for the selection of Cyrus Ching, vice president of the United States Rubber Co. as chairman of the committee which was to hold its first meeting in Detroit Jan. 14.

The setup of the subcommittee broke a deadlock of the original 10-man committee, made up of five members each from the industry and CIO's UAW, and its selection marked a victory for both the OPM and the industry. Labor had demanded equal authority with management and wanted a share in plans for conversion without getting Government approval, an act that might lay management liable to anti-trust action.

The industry members of the subcommittee are Edsel Ford, president of the Ford Motor Co.; C. E. Wilson, president of the General Motors Corp., and C. C. Carlton, vice president of the Motor Wheel Corp. The labor members are Walter Reuther and Richard Frankensteen, vice presidents, and George F. Adde, treasurer, of the UAW. Mr. Ching is a member of the Defense Mediation Board.

SCRAP

Industry-Wide Scrap Drive Mapped Along Lines of Erie Plan

Washington

• • • **A plan of** industry-wide salvage of iron and steel and nonferrous scrap and other old materials is to be put into effect in a few months by OPM, in more than 30 centers. The plan, known as the Erie program was begun in Erie, Pa., Dec. 12 and is being worked out by leading manufacturers in the vicinity with the approval of OPM.

The plan recommended is as follows:

1. Arrange in every plant for the appointment of a "Salvage Department Manager," or for the delegation of an individual in each plant to be responsible for: (a) wrecking of abandoned and obsolete machinery and equipment; (b) utilization of all critical materials to the best advantage; (c) minimization of waste and spoilage; (d) re-use of blanks, cut downs, short ends, clippings; (e) selective handling and segregation of scrap and overage at source; (f) avoidance of contamination; (g) speeding the return of scrap and waste materials through existing channels to mills and refineries.
2. Train men in the definition of scrap, its handling and salvage.
3. Install a system of periodic reports on scrap collected by every plant to the executive committee of the district involved.

The Erie program was launched when leading executives of local industry, trade and business associations attended an organization meeting and set up an executive committee.

This committee is composed of the following: F. E. Bliven, General Electric Co.; R. C. MacElroy, United States Metals Products Co.; M. F. McCarty, Erie Forge & Steel Co.; Harry Bole, Erie Foremen's Association, and Dana Jones, Manufacturers Association of Erie.

The individual "salvage managers" in the various plants designate their own plant and departmental salvage committees and work out their own system of handling, reporting, etc., as well as methods to be followed in wrecking obsolete machinery, disposing of out-of-date or discontinued finished products and other stored materials not likely to be used.

Since the success of a salvage program depends upon the cooperation of the man at the machine, the salvage managers agreed upon a 3-point program to be brought to the attention of every employee, urging him to:

1. Conserve materials, minimize waste and spoilage.
2. Sort blanks, short ends, cut downs, clippings, etc., with a view to their reuse either in his department or plant or by some other department or plant in the district.
3. Separate unavoidable scrap and cut downs at the source; avoid contamination.

o o o

Partial Release of Old Auto Parts Urged

Chicago

• • • **By turning into scrap** a percentage of parts now held by auto wreckers for repair and replacement sales, about 12,500 tons of scrap could be obtained from 500 Illinois auto wreckers at once, according to Maurice Bennett, chairman of Scrap and Steel Auto Wreckers, Illinois. He emphasized that the wreckers should be permitted to keep a portion of their stocks for repair sales.

In addition, Bennett estimates that between 30,000 to 40,000 tons of scrap could be obtained from about 1500 used car dealers in this area who have an average of 15 to 25 cars apiece standing on their lots which are "good for nothing else but scrap." Bennett contends official action is necessary to pry loose scrap held not only by auto wreckers and second hand dealers but by private individuals as well.

He urges appointment of three-man committess in principal areas to visit wrecking yards and determine the parts to be sold as scrap, and a tax on wreckers and used car dealers of $5 per car older than 1934 models kept on hand more than 10 days, and $5 for each additional 10-day period it is kept in stock.

(Last week E. C. Barringer, secretary, Institute of Scrap Iron & Steel Inc., estimated auto graveyards hold 5,000,000 to 6,000,000 old cars. Curtailment of auto output has given some wreckers the idea old jalopies can be made usable, he said. About 2,500,000 cars are wrecked in a normal year, he said, but this year the scrap industry wants at least 4,000,000 units wrecked.)

o o o

Scrap Situation Even Interests Congress

Washington

• • • **The shortage of iron and steel scrap drew brief attention at the opening of the second session of the 77th Congress.**

Representative Michael Kirwan of Ohio suggested that all state, county and city trucks be mobilized for the collection of scrap. Simply let householders place their scrap in the streets before their homes and it would be picked up by the trucks, he said.

Representative John Lesinski of Michigan offered the many times proposed plan, which is being effectuated in some sections, of rounding up the thousands of automobiles lying in heaps over the country.

(Late last week a bill was introduced by Representative Lesinski providing for a tax of 100 per cent of the sales price on scrap metals held by a dealer for more than 90 days. He said the bill is designed to stop the holding of scrap for speculative purposes and argued that "millions of tons" of scrap metal now lie dormant and that another 3,500,000 tons could be recovered from farms and homes.)

Wreckers Criticized

Philadelphia

• • • **Joseph H. Miller,** chairman of the State Auto Wrecking Committee, this week charged many of Pennsylvania's auto graveyard owners with not keeping their promise to move more scrap iron and steel. Some members of the scrap industry, the auto graveyard industry, and the used car industry are conducting their business in a manner hardly calculated to speed the production of shells and arms that the Services need so badly, he stated.

Miller criticized wreckers at Scranton and Allentown, saying more than 1200 cars fit only for junking are in yards of that area. The charges were denied by Carl Hoffman of Allentown, member of the OPM auto wreckers' committee.

(Turn Page for More Scrap News)

Collections Falter Due to Zero Wave; More Furnaces Idle

• • • **Cold weather** and heated controversies plagued the iron and steel scrap industry last week, with the former temporarily intensifying the critical supply situation which is now in its most crucial stage.

Collections slumped in practically all principal consumption centers due to the cold weather. The lack of automotive scrap affected steel production at Youngstown and Cleveland, where additional open hearths were taken out of action. Even in some areas, like Southern Ohio, where the number of active open hearths remained unchanged, the total amount of raw steel obtained from the units was lower. At Detroit, Sharon, and Lackawanna production units previously removed from use were still idle.

Hottest controversy centered around the automobile wrecking industry, source of much scrap. Charges that wrecking yards are not producing the fullest possible amount of material were countered by assertions of the wreckers that they are doing everything possible under the circumstances.

Scrap brokers and consumers alike were awaiting the effects of the passage of the price bill by Congress, which, although not generally admitted, is expected to have a decisive effect upon adherents to the present scrap order.

•

PITTSBURGH—The sub-zero weather at Pittsburgh last week is being reflected in lack of scrap for melting purposes this week. Collections last week dropped as much as 50 per cent at some yards which accentuated the already existing scrap shortage. The number of cases where open hearths are being retired temporarily or slowed down due to lack of scrap is expected to increase as winter progresses. Brokers are having extreme difficulty in locating cast scrap under the new price setup and some doubt that they will ever be able to find this material at the present price level. Where the cast scrap is going is anybody's guess but some indicate that it might be going to open-hearth furnaces.

•

PHILADELPHIA—Cold weather in the Eastern Pennsylvania area during the past two weeks slowed up the scrap movement considerably. Mills reported that stocks were becoming quickly depleted. However, it is felt by consumers that with the present break in the weather, shipments will move in better order and at least as much scrap will move in as is being used.

•

CHICAGO—Shipments fell off sharply (some quarters estimating as much as 75 per cent) due to the bitter sub-zero wave last week. Added to this, was the dropping off of sales of various grades

Groceries for Scrap Is St. Louis Offer

St. Louis

• • • So frantic is the effort to get scrap that a large grocery house advertised in newspapers here Sunday urging that scrap be brought in and exchanged for merchandise, the accumulation to be handled through a dealer. Half of the day's receipts were to be given to a charity.



which had been going as low phos before the latest schedule changes. Despite the stringent condition of the market, local mills still are managing to keep their furnaces going week by week in happy contrast to mills in other sections of the country. They are now saying that a whopping reduction in operations due to scrap will hit this district next month, but this has been said regularly for the past three months. Just when the tumble over the brink will come is anybody's guess.

•

DETROIT—A better flow of scrap into Great Lakes Steel Corp. has resulted because virtually all scrap in the Detroit area is being allocated to this mill for the time being. Great Lakes continues operations with four furnaces banked and the remaining 12 operating on a hand-to-mouth basis.

•

CLEVELAND—The Cleveland and Youngstown scrap situations have grown worse during the past week. Otis Steel took two of its Cleveland units off, while Youngstown Sheet & Tube and Carnegie-Illinois each shut down a furnace at Youngstown due to insufficient scrap. Companies affected earlier included Republic Steel with two furnaces down at Warran and four idle at Youngstown, and Sharon Steel with one open-hearth made idle by lack of scrap. Moreover, electric furnaces in the Cleveland district are worried by inability to secure enough scrap to support operations. Foundries are also in a bad way with stoppages already beginning to crop up. The halting of automobile production deprived the Cleveland district of this important source of scrap and contributed to the Otis curtailment. Mayor Lausche has named a scrap committee headed by A. L. Prentice, scrap reclamation manager of New York Central Railroad to attempt to find material. The Chamber of Commerce has announced plans for the collection of scrap from northern Ohio farms.

•

BUFFALO—Sub-zero temperatures and heavy snowfalls brought all scrap yard operations to a standstill. Open hearth operations may reflect the situation in weeks to come. Bethlehem Steel Co. continues to have from five to seven open hearths at its Lackawanna plant idle because of the scrap shortage but Republic's local plant continues at capacity. The low phos situation under the new schedule is declared unsatisfactory and dealers are looking for early modifications. A decided drop in the movement of cast scrap has been noted. Dealers hold the $1-a-ton allowance for making foundry steel into 2-ft. lengths "the worst feature" in the setup.

•

BIRMINGHAM—Extremely cold weather has deterred scrap gathering, and combined with the usual after-holiday lull has made difficult any accurate appraisal of the recent price revisions.

•

BOSTON—Snow and cold practically put a stop to the scrap movement. The trade is still displeased with the price of cast; the ruling that straight carlots of each grade of open hearth material must be shipped, and the $2.50 a ton penalty. Of much interest was a recent court ruling that the Boston Elevated Railway must remove its Atlantic Avenue elevated structure involving 10,325 tons with approximately 5,000 tons of rails, and the sale of 600 tons of trolley poles by the Springfield (Mass.) Street Railway Co.

•

TORONTO—Consumers of iron and steel scrap are becoming more desperate. Dealers state they have no cast in their yards and supplies coming in are not sufficient to meet pressing demands. In recent weeks fairly large tonnages of iron scrap have been moved from Western Canada to Ontario to help offset the shortage in the East, with consumers paying the additional freight charges. Some tonnages, mostly against old commitments, still are arriving from the States.

•

CINCINNATI—Extreme cold weather has created problems for dealers here. While some feeling is held that the new schedules will help the situation, sub zero weather has tended to slow the flow of materials. No serious dislocations are reported so far.

(Scrap Prices on Next Page)



10 HOURS SAVED!

Turning

This Long Forged Shaft With KENNAMETAL Tools



Previously this 45 ft. long rough forged steel shaft was turned to 7½" diameter with high speed steel tools in two cuts and with frequent "down time" for regrinding tools. By using two sharp KENNAMETAL tools on this job, roughing and finishing were combined in one cut, the speed was increased to 210 ft./min., and only one regrind per tool per shaft was required. As a result, KENNAMETAL reduced machining time from 13 hours to 3 hours; that is, completed the job in less than ¼ the previous time.

ORDERS FILLED PROMPTLY

Standard and Modified Standard KENNAMETAL tools are shipped within 10 days of receipt of order; tool blanks within 2 to 4 days. Write for new Catalog No. 42.

The Largest Manufacturer of Steel-Cutting Carbide Tools

McKENNA METALS Co.
144 LLOYD AVE., LATROBE, PA.
Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York (Exclusive of Canada and Great Britain)

KENNAMETAL The Accepted STEEL CUTTING CARBIDE

IRON AND STEEL SCRAP PRICES

Revised to Dec. 23, 1941

(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

OTHER THAN RAILROAD SCRAP

	OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE AND FOUNDRY GRADES											
			Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
	Machine Shop Turnings		Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	22.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of South San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are taken for purposes of deducting. For exceptions see official order.

REMOTE SCRAP: Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap."

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Stove plate	14.00	15.00	16.00
Heavy breakable cast	16.50	17.50	18.50
Charging box size cast	17.25	18.25	19.25

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes all states not named in groups A and B.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Jan. 13, 1942	Jan. 6, 1942	Dec. 15, 1941	Jan. 14, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, bars	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Jan. 13, 1942	Jan. 6, 1942	Dec. 15, 1941	Jan. 14, 1941
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	20.38	19.38.
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$21.75
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.50
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	19.00
Low phos. plate, Youngs'n	23.00	23.00	23.00	25.00
No. 1 cast, Pittsburgh	22.00	22.00	22.00	21.75
No. 1 cast, Philadelphia	24.00	24.00	24.00	23.50
No. 1 cast, Ch'go*	21.00	21.00	21.00	18.75

*Changed to gross ton basis, April 3, 1941.

Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.125	$6.125	$6.125	$5.50
Foundry coke, prompt	6.875	6.875	6.875	5.75

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	50.10
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	5.70	5.70	5.70	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 106 to 112 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 13, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.45 a Gross Ton	$20.66 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars **	Pacific Ports, Cars **	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢					2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10						$5.32
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			3.37¢
TERNES, M'FG.															
Special coated, basebo x	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton = 2.70¢					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont = 2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(11)		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. ** Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland.	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

	Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem	$54.00

TOOL STEEL

(F.o.b. Pittsburgh)	*Base per Lb.*
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	$25.50	$25.00	$26.50	$26.00	.....	.....
Brooklyn	27.50	.....	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.. ..
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....
St. Louis	24.50	24.02	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	....$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	26.63	.....	27.13	26.63	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	27.50	.....	.....	.....	.....	.....
San Francisco	27.50	.....	.....	.....	.....	.....
Seattle	27.50	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of basic grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, *Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices.)*

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.25	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.65
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.90	4.23	6.85
Sheets, galvanized	4.65	4.85	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.50
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43.

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk.....80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails.....$2.55

Coated nails 2.55

Cut nails, carloads..... 3.85

Base per 100 Lb.

Annealed fence wire.....$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price = $200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.



At the melting platforms is the white-hot secret of superior *DISSTON TOOL STEELS*

Perhaps nowhere in the whole steel-making process... from scrap yard to final inspection...is Disston's painstaking care with details so clearly demonstrated as at the melting platforms.

Disston's modern melting practice has a basis of 87 years' experience in the manufacture of high grade steels. In 1855, Henry Disston melted and rolled the first crucible saw steel made in America. Again in 1906, it was Disston pioneering that brought about the casting of America's first commercial heat of electric saw steel.

Today Disston's electric furnaces are charged with carefully segregated scraps...selected for specific purposes by expert metallurgists. Then the molten steel is cast from shallow ladles into the smallest molds that will give ideal reduction from ingot to finished rolled size.

Such metallurgical controls by Disston make possible precisely made alloy and carbon steels, with predetermined grain size, excellent soundness and exceptional cleanliness. Take, for instance, Disston Standard Tool Steel, used for many hand and machine tools where depth of hardness is not important, but where high fatigue resistance and high elastic limit are desirable.

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This Steel is fine grained, medium hardening and clean. It may be specified in any carbon range, but is usually stocked at .95-1.05%, with phosphorus and sulphur .020% max. Disston Standard Tool Steel is carefully tested for surface condition. After heat treatment, it will show a high degree of fatigue resistance and high elastic limit. It is recommended for the regular line of hand and machine tools where depth of hardness is not an important factor.

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DISSTON TOOL STEELS

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio.....$29.50*
Buffalo $30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... $2.00
Ferrotungsten, 100 lb. and less $2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equalized with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.... $4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn..65c. to 66c.
African, Indian, 49-51 Mn..67c. to 69c.
Brazilian, 46-48 Mn.....69c.
Cuban, 51 Mn .....78c.

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..Nom.
Rhodesian, 45 .....$32.00
Rhodesian, 48 .....$39.00-$40.00

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

Connellsville, prompt ...$6.00 to $6.25

Foundry

Connellsville, prompt ...$6.75 to $7.00

*Maximum coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey.... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks.....$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

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The IRON AGE

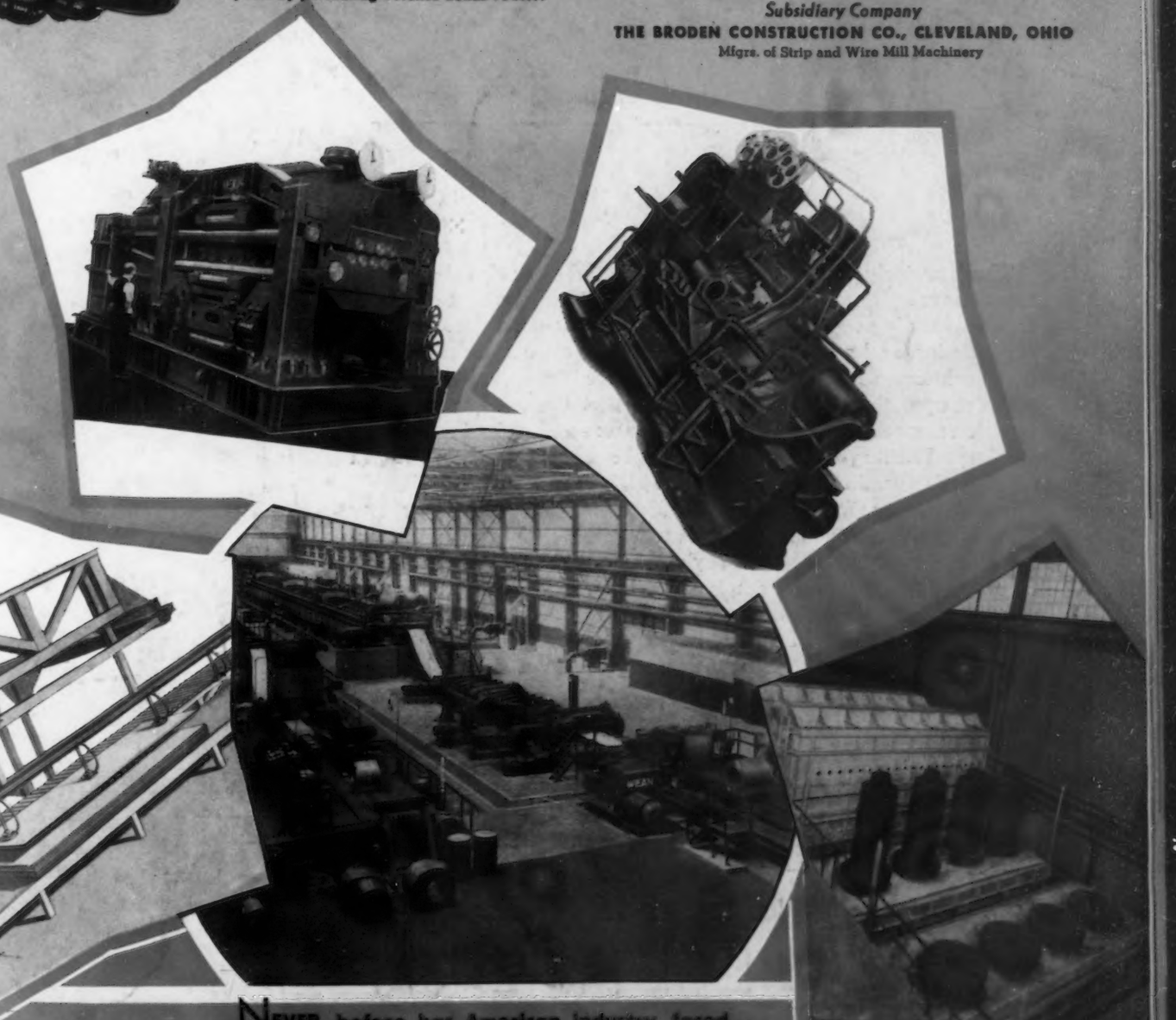
JANUARY 22, 1942

EQUIPMENT for OFFENSE by the WEAN

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Subsidiary Company
THE BRODEN CONSTRUCTION CO., CLEVELAND, OHIO
Mfgrs. of Strip and Wire Mill Machinery

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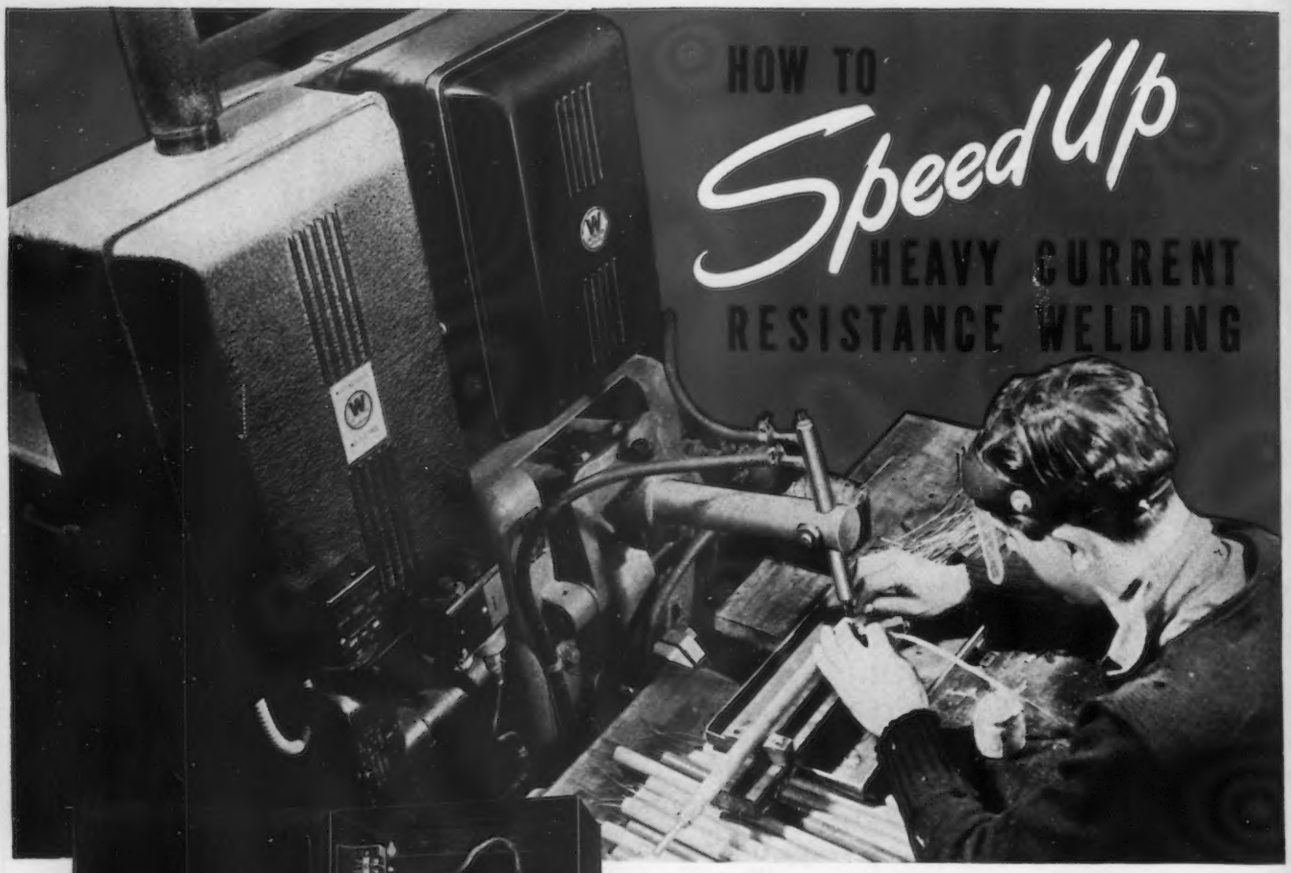
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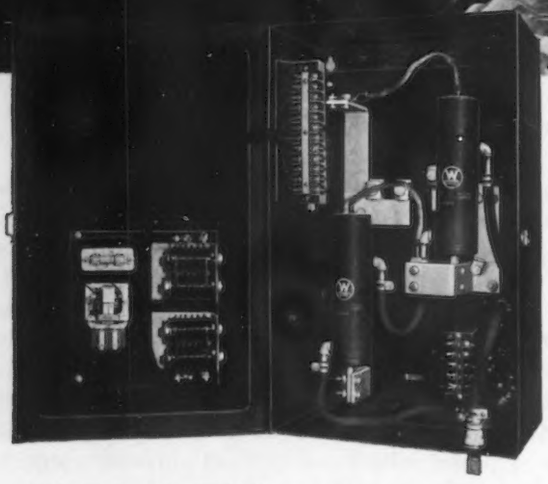
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THE IRON AGE

JANUARY 22, 1942

ESTABLISHED 1855

Let's Learn from Russia

I THINK we can learn something from Russia. By observing what she is able to do after what Germany first did to her, we can learn not only how to "take it" but also how to "dish it out."

But we can learn something else too. Something Russia had to learn before she got "rolling." And that is that the theory of committee management either in tactics or industry has to go out the window in a wartime economy.

There was a time in Russia when a manager's job was a difficult one. He was no longer the boss, for in every factory there was a workers' council as well as a representative of the Comintern, both of which could and did take exception to his orders when the spirit moved.

This was in the early days of the great experiment, when Russia has embarked upon her "five-year plans." It was an uncomfortable time for the manager, for if he did not get out enough work, the commissar of the Comintern would have him on the carpet and if he worked the boys too hard, or they thought he did, the workers' council would put him over the jumps.

Of course, that theory of getting things done did not work very well and it had to be greatly modified even before Russia's entry into the war, with management getting more and more authority, subject, of course, as it is in this country, to the right of labor to register legitimate complaints.

Even if experience in peacetime had not brought about this change, the war would have done it. Today, Russia's affairs, both military and industrial, are being conducted along strictly authoritarian lines; more so indeed than we are conducting ours in the U.S.A.

We cannot imagine, for example, Soviet General Zhukov giving an order for an advance and then having the boys say: "Wait, we'll have to take a vote on that."

Nor can we imagine that in Russia's munition plants which are turning out the sorely needed weapons to back up the advance, the workers are not taking orders from management and liking it.

Yes, we can learn something from Russia. We can learn that when you want to win a war, you have to delegate authority to individuals who have shown themselves capable of exercising it and not depend upon hybrid committees, picked for political expediency, for management. And unlike England or Germany or Russia, that is exactly what we have been doing until last week in almost every phase of our preparations. Now we are beginning to get the "one man" idea, as evidenced by the new WPB. And we should extend this policy down the line.

If Mr. Reuther or Mr. Frankensteen of the CIO, for example, are better qualified to run General Motors or Ford or Chrysler than the men who have built them, one of them should be given the job outright. But we will not get anywhere with this great industry by making its management subject to the orders of a super soviet.

J. H. Van Deventer

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Silicon Monoxide

By C. A. ZAPFFE and C. E. SIMS

Research Engineer and Supervising Metallurgist, Battelle Memorial Institute, Columbus

. . . Investigations of the equilibrium relations of silicon and oxygen in delta iron, published by the American Institute of Mining and Metallurgical Engineers, have led to the conclusion that silicon monoxide may be an important entity in steel making reactions. Because this has never before been considered, the data herein have been assembled.

AN investigation of silicon-oxygen equilibria in liquid iron, discussed in a different article,[36] led to the conclusion that the monoxide of silicon may play an important role in steel making. In this present article all available recorded information on SiO, gained principally from non-metallurgical literature, is discussed to show that SiO not only may exist at steel making temperatures, but that its action in steel making may be of considerable importance in explaining observations heretofore classed as anomalies.

On the basis of the present results obtained for the equilibria in the system Fe-O-Si-H, numerous relationships for SiO are calculated to show the relative abundance of [SiO] and [Si] as contained in ordinary silicon analyses of steel. Five principal reactions, representing, respectively, the reduction of SiO_2 by Fe, H and Si, and the reduction of FeO and H_2O by Si to form SiO, are considered in detail. $\triangle F°$, $\triangle S°$, and $\triangle H$ are calculated for each, and equations are developed, expressing the equilibrium constants as functions of temperature.

The significance of SiO in steel making reactions is thereby made plausible, although the actual values must await better definition from future research. In addition, the possible importance of SiO in explaining anomalous behavior of slags and refractories at high temperatures is cited. Several examples of such anomalies are used to illustrate how recognition of the monoxide of silicon may simplify their understanding.

Discovery and Identification

That silicon monoxide, SiO, has not been suggested in regard to chemical reactions in steel making is, in a measure, surprising because this compound has been discussed in certain branches of science since Winkler first tried to prepare it in 1890[1]. In fact, one of the present authors had some experience years ago — an experience that will be recognized by many now that it is brought to their attention—with a yellowish brown vitreous condensate often found in the cooler portions of the acid electric furnace when conditions were strongly reducing. An analysis of that condensate, which was visibly some form of silica, showed enough Si to account for over 130 per cent SiO_2. Calculated to SiO, the analysis was slightly less than 100 per cent.*

Similarly, inquiry has shown that SiO has been recognized for many years by producers of silicon carbide, although the true chemical identity of the substance was not positively established. One correspondent states:**

** In an investigation on the production of Sillimanite nearly 20 years ago, silicon monoxide was freely discussed as a stepwise product in the decomposition of SiO_2 by carbon. See "Preparation of Artificial Sillimanite for Refractory Uses," by C. E. Sims, H. Wilson and H. C. Fisher, Transactions of the American Electrochemical Society, Vol. 46, 1924, pp. 513 to 530. Also, "Artificial Sillimanite as a Refractory," by H. Wilson, C. E. Sims and F. W. Schroeder, Journal of the American Ceramic Society, Vol. 7, 1924, pp. 842 to 855 and 907 to 916.*

*** Private Communication from W. R. Whitney, General Electric Co., Jan. 31, 1941.*



FIG. 1—Room temperature residua of silicon monoxide. Left, massive specimen such as results from slow cooling, analyzing 98.5 per cent SiO. Right, pulverulent specimen, usually resulting from rapid cooling of SiO vapor.

"Silox, or SiO, was manufactured . . . up to about 1920. We used a mixture of sea sand and petroleum coke. This was fed into a closed brick arc furnace with a condensing chamber outside the building. The sand-coke mixture muffled the arc, giving a fairly constant energy input. The arc temperature with the coke reduced the SiO_2 to SiO. The fine, very light SiO condensed in the outside chamber in the form of sheets suspended from the ceiling. These sheets resembled in color and shape an elephant's ear, hence this name was applied by the men in the shop.

"A sample of SiO could be readily made by using a block of graphite for a ground and a welding electrode to make the arc. With the arc well covered with sand-coke mixture some SiO would be formed and could be collected in a vessel inverted over the electrode."

Again:†

"Our examination by the X-ray powder diffraction method of samples of what we call 'silicon monoxide' indicates that it is chiefly a mixture of silicon and silica. The silica occurs as a partly devitrified silica glass, the crystalline form being chiefly cristobalite. Both of the crystalline phases are submicroscopic and are evenly dispersed. It is opaque, and microscopic examination indicates a homogeneous material.

"We have also examined some old powdered material which was marked 'silicon monoxide' that we found contained considerable submicroscopic SiO as well as Si and SiO_2, but the chemical analyses indicated it to be approximately what could have been SiO. Since, in any case, the chemical analysis is that of a material that would have approximately the composition SiO, the formerly accepted opinion that it was a definite compound seemed valid, when such methods of analysis as X-ray diffraction were not yet available.

"This type of material is now very seldom formed, as the irregular conditions that caused its formation have been eliminated from commercial furnaces."

† *Private Communication, R. C. Benner, The Carborundum Co., Niagara Falls, New York. Feb. 3, 1941.*

The first rigorous examination, in fact the discovery of silicon monoxide, was made by Potter in 1905 [6, 8, 10-12, 16] while working with the electric furnace. Potter, after analyzing the peculiar, light condensate, patented a process for its manufacture [6, 8, 16] and marketed the material under the trade name of "Monox." His work received some attention—[5, 7, 9, 13-15, 18, 19, 21, 30] and then apparently was forgotten.

Mellor[23], says of silicon monoxide:

". . . At the temperature of the electric arc, however, C. Winkler's reaction,

$$SiO_2 + Si = 2\,SiO$$

can be realized. According to Potter, to effect a partial reduction of silica to silicon monoxide, a mixture of the former with the necessary proportion of carbon is heated electrically in a closed furnace of either the resistance or arc type, provision being made for withdrawing the carbon monoxide gas as it is formed. . . . The reduction can be made with carbon:

$$SiO_2 + C = SiO + CO$$

or silicon carbide:

$$SiO_2 + SiC = SiO + CO + Si$$

and silicon itself can act on carbon monoxide, forming the monoxide:

$$Si + CO = SiO + C$$

or the oxycarbide:

$$Si + CO = SiOC$$

"The reaction between silica and silicon is energetic at about 1800 deg. C. The proportion of silica and carbon in the mixture does not influence the composition of the final production, but the yield depends on the proportions of the initial materials. . . . Monox is an opaque powder, silky to touch and of a yellowish-brown color. Its specific gravity is 2.24; and its apparent specific gravity 2.04. It remains solid at 1700 deg. C. The vapor should be cooled as quickly as possible in its preparation to prevent as much as possible the dissociation:

$$2\,SiO = Si + SiO_2$$

". . . The chemical properties of Monox are often masked by a pellicle of silica which forms on its surface when exposed to air. Monox burns in oxygen. If blown through a flame, it is oxidized and whitened but it still retains its pulverulent form. It decomposes water with the evolution of hydrogen, but the reaction soon ceases because of the formation of a protective layer of silica. Monox dissolves in warm solutions of alkali hydroxides giving hydrogen and the alkali silicates. Hydrofluoric acid attacks it, leaving a residue richer in silicon; and if an oxidizing agent be added to the Monox, all is dissolved excepting a small amount of silicon carbide impurity. When mixed with red lead litharge, or a peroxide, and ignited, Monox gives a violent reaction. Monox can be used alone or in combination as a pigment; or pressed into bricks with or without the addition of alumina, magnesia, etc., to form abrasion wheels."

Definite evidence for the existence of SiO was not forthcoming, however, until after 1924, when Jevons first found what appeared to be the band spectra of SiO.[20] In 1928, Jevons corroborated his earli-

er work and verified the existence of SiO at high temperatures[24]; and Bonhoeffer,[23] in that same year, identified the SiO band spectra in the reaction of carbon with SiO_2 above 1500 deg.C. In 1932, Saper[25, 26] added to the evidence by studying the ultra-violet band spectra of SiO. In 1938, Biltz and Ehrlich[28] demonstrated that silicon metal can vaporize as a sub-oxide at a rate that is much greater than that of the pure metal. Woods,[34] in a contemporary publication, identifies SiO.

The most complete work is that of Zintl and his co-workers, who have recently investigated both the monoxide of silicon[31, 35] and of boron.[32] Their studies developed from the observation that, during the distillation of aluminum-silicon alloys, mixtures of SiO_2 and Si vaporized rapidly under conditions that would not vaporize either of the individual components. Potter's several experiments were first repeated, and his results were verified. In addition, these investigators found that metallic silicon, besides reducing pure silica to the monoxide, would reduce SiO_2 from many of its compounds. For example, they list the following reactions taking place at 1450 deg. C., in vacuo:

$$(Al_2O_3)\,(SiO_2)_2 + 2\,Si \longrightarrow Al_2O_3 + 4\,SiO$$

$$(BeO)_3.(Al_2O_3)\,(SiO_2)_6 + 6\,Si \longrightarrow (BeO)_3\,(Al_2O_3) + 12\,SiO$$

$$(ZrO_2)\,(SiO_2) + Si \longrightarrow ZrO_2 + 2\,SiO$$

$$(Al_2O_3)\,(SiO_2)_2 + 2\,C \longrightarrow Al_2O_3 + 2\,CO + 2\,SiO$$

$$Nb_2O_5 + 5\,Si \longrightarrow 2\,Nb + 5\,SiO$$

In each case, stoichiometric portions of Si were added, and only traces of either Si or SiO_2 remained. They listed the following reactions of SiO, besides those just cited from Mellor. Because of the dissociation of SiO at lower temperatures, the following equations might possibly be written more correctly with Si-SiO_2 replacing SiO.

$$SiO + H_2O = SiO_2 + H_2$$
(Strong reaction at 500 deg. C.)

$$SiO + CO_2 = SiO_2 + CO$$
(Slow at 400 deg. C.)

$$2\,SiO + 2\,Cl_2 = SiO_2 + SiCl_4$$
(Rapid at 800 deg. C.)

$$2\,SiO + SO_2 = 2\,SiO_2 + S$$
(Slow below 800 deg. C.)

$$SiO + 2\,NaOH = Na_2SiO_3 + H_2$$

Burned dolomite heated with burned lime and SiO in vacuo at 1350 deg. C. yielded a 99 per cent distillation of magnesium in two hr.:

$$(MgO)\,(CaO) + CaO + SiO = Ca_2SiO_4 + Mg$$

Likewise, zinc oxide yielded 98 per cent of its zinc in one hr. at 1300 deg. C.:

$$ZnO + 2\,CaO + SiO = Ca_2SiO_4 + Zn$$

Recently these same investigators have patented a process[35] for removing silica from minerals, slags, and similar materials, in which the reaction:

$$(Me_xO_y)\,(SiO_2)_n + n\,Si = Me_xO_y + 2\,n\,SiO$$

is allowed to proceed in vacuo at temperatures above 1250 deg. C. The stoichiometric quantity of Si added to the material quite completely removes the silica, it was found.

Photographs of the room temperature residua of silicon monoxide are shown in Fig. 1, both for the massive and for the pulverulent forms. The botryoidal shape of the specimen on the left is typical of a condensate and results from slow cooling, in most cases; whereas the powder is more often produced by rapid cooling of the SiO vapor. The massive specimen analyzes nearly 100 per cent SiO. The powdery specimen may often show SiO_2 in quantities greater than can be accounted for by the decomposition of SiO, because oxidation by the atmosphere is so much more likely. Under high magnification the large specimen shows tiny globules that are probably silica formed by decomposition. An X-ray diffraction pattern shows some unidentified diffuse lines along with the patterns for Si and SiO_2.[33] SiC may also be identified in some cases.

The fact that the X-ray pattern does not show a definite SiO structure is not necessarily conclusive, since the customary form of the monoxide may not be crystalline. That the pattern shows Si and SiO_2 conforms to expectations. A temperature change of 1500 deg. C. brings tremendous chemical changes to most substances; consequently, it is not right to expect to obtain at room temperature those chemical forms existing at temperatures of liquid steel. That iron monoxide, FeO, exists in liquid steel but decomposes during cooling has been well established. The identification of the band spectra of SiO made during the last 15 years appears to constitute positive evidence for the existence of the compound; and the fact that the sublimate is stoichiometrically SiO is further evidence. There seems to be no acceptable alternative for the explanation of the evaporation of Si-SiO_2 mixtures that has just been recounted.

The existence of SiO at steelmaking temperatures should occasion no more surprise than does its analog CO. Another chemically similar element, titanium, has a recognized monoxide form at high temperatures.[29] Metallurgists freely assert, and chemists claim as a fundamental law, that all compounds tends to assume simpler forms at high temperatures. For iron, carbon and manganese, only the monoxide is ever considered by metallurgists as being the dissolved oxide form in liquid steel. Why, then, should the monoxide of silicon be made an orphan?

Even in the absence of the foregoing evidence for the existence of SiO at steel making temperatures, the recommended approach in studying steel making reactions, it would seem, would be to regard SiO as a possible entity until its existence could be disproved. Now that its existence deserves consideration, its importance remains to be determined.

Ed. Note: — Next week the authors discuss the importance of SiO to steel making, and examine the metal reactions.

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▲ ▲ ▲ Material Handling P

By C. H. BARKER, JR.
Supervisor of Production, and Chairman, Material Handling Committee, General Electric Co., Bridgeport, Conn.

IN making the United States the Arsenal of Democracy, second in importance to the actual production of the guns, tanks, planes and ships is the expeditious handling of materials all the way from the mining of ores through the various fabricating processes to the point where the finished products of industry are turned over to the U. S. Army or Navy or to those foreign governments fighting for the common cause. In reality, the handling facilities employed in the mill, factory and at transfer points between transportation media have practically as much to do with our maintaining a continuous flow of supplies to the battle fronts as has the final convoying of merchant ships carrying the fruits of industry and agriculture through submarine-infested waters.

In the industrial expansion necessitated by the national defense program, many problems arise which require the application of the most modern handling techniques evolved for similar applications prior to the present emergency. The present is no time for engineering development along these lines; rather we must pursue the course of making certain that the methods employed are those that have been tried and proven to be the most efficient. Those responsible for directing this material handling activity should be experienced engineers

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familiar with all the problems in their line of endeavor and with all the available equipment. These engineers should be given sufficient authority to insure the development of a thoroughly co-ordinated system within the confines of their responsibility. Too much effort and time cannot be devoted to the exchange of data and experiences throughout any industry in order to arrive at the best solution.

The planning of layouts and facilities for new buildings or complete new plants offers real opportunities to approach an ideal of perfection. The temporary leasing of vacant buildings for manufacturing, on the other hand, is accompanied by more limitations, and the material handling system evolved is more likely to be one adaptable to existing conditions. Rearrangements due to a changing product demand, or transitions from non-

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defense to defense production are quite likely to offer the most difficult problems from a handling standpoint during this period of expansion.

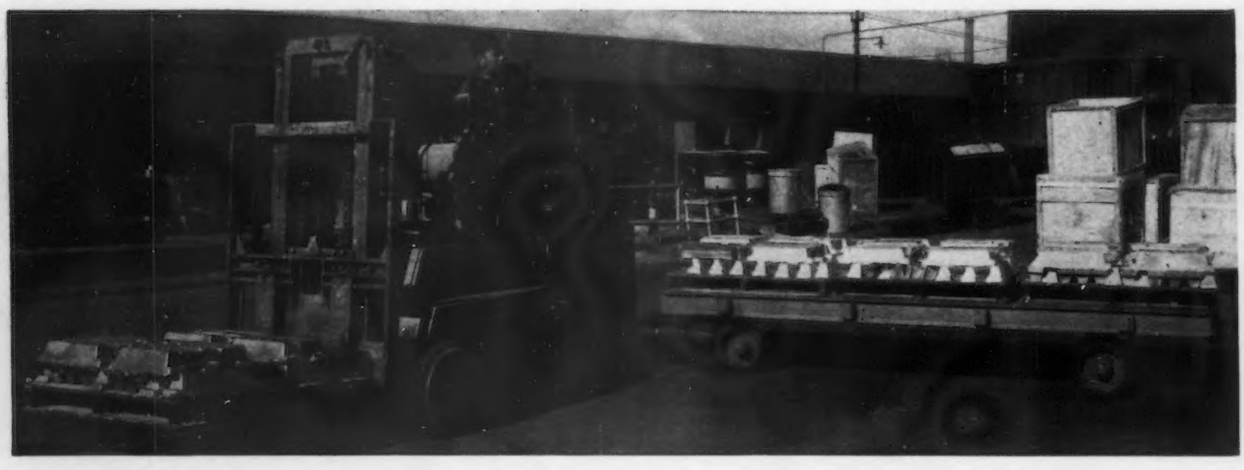
When confronted with any set of these conditions, it must be remembered that any economies possible in handling, even though they be a long way from the ideal due to physical and other limitations, should be practiced since every cost reduction means greater speed in producing the end product with less workers, thus releasing man-hours for other important defense work in addition to helping Uncle Sam get more for every dollar expended for defense.

As more and more defense business is secured, unbalanced inventories of raw materials due largely to procurement difficulties are rapidly changing production schedules for finished products, and have made many inventory control procedures less effective. The resulting higher inventories and the general shortage of space have only added to the complexity of material handling problems.

It would be advisable to notice the handling equipment employed at the modern airports used by the leading air transportation system. Substantial portable equipment of all kinds, designed to perform a particular function very efficiently, is utilized to load planes with lug-

FIG. 1

FORK truck transporting 16,000 lb. of reclaimed pig lead.



g Preparedness

gage, mail, fuel and other supplies, as well as to facilitate the boarding of passengers and the maneuvering of planes themselves from the hangars to the field. Naturally, this equipment is streamlined and dressed up in keeping with the unsurpassed appearance of the present day transport planes, all of which add to the impressiveness of the smoothness and speed with which the work is done. Anyone interested in industrial material handling making such observations cannot help but compare the operation to a thoroughly planned handling system employed in one of the newer steel mills or ammunition plants. Likewise, a strong contrast with the older plants not employing improved handling methods is apparent.

Ideas from Other Fields

The continual progress in handling equipment developed and employed in the lumber mills in the Far West and in the yards in the East is worthy of consideration. Notable are the combination straddle and fork carriers capable of transporting two large unit loads of lumber at once, one underneath between the wheels and the other forward on forks. This combination truck also provides tiering facilities in addition to long haul transportation. This heavier outdoor equipment gains favorable acceptance rapidly because the basis for handsome savings is the unit load principle with portability in every respect.

Simpler equipment offering somewhat similar facilities in a metal manufacturing plant is shown in Fig. 1. Loads up to 24,000 lb. are being transported today with this equipment. Rolling equipment, being at a premium, is being called upon to carry capacity loads on every trip. Fork trucks with travel and lift mechanisms operated by fluid drive transmissions are now in operation and offer possibilities of less wear and tear resulting from fewer moving parts.

Fig. 2 indicates what unit loads of sheet steel, serviced by either overhead cranes or fork trucks, can



FIG. 3
COILED steel on open faced pallets being placed in storage.

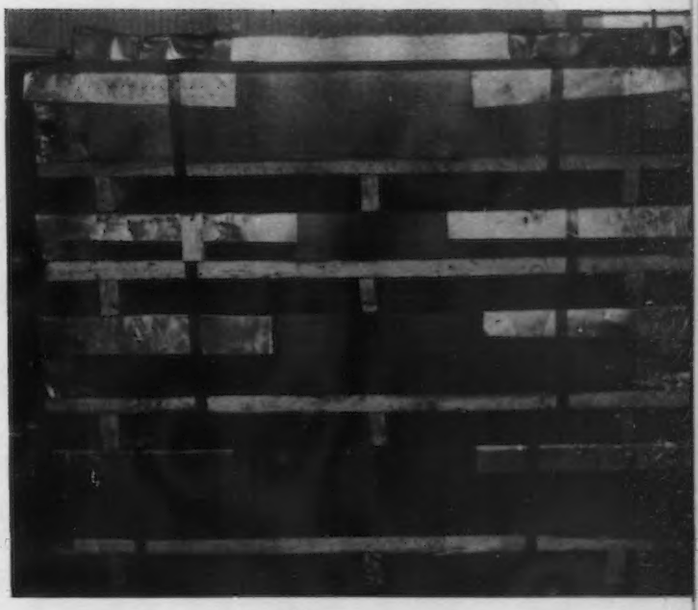


FIG. 2
STORAGE of sheet steel in unit loads.



FIG. 4
UNIQUE unit loads of fine wire on spools.



Fig. 5—Processing drums designed for use with fork trucks.

do for a warehouse operation. Fig. 3 reveals double unit loads of coiled steel arriving in storage after being taken directly from freight car. Unit loads can be shifted readily, making all items available at all times.

Fig. 4 illustrates how fine wire on spools is transported from the wire mill to cable processing plant. After the stranding of the electrical conductor, insulation and protective surfaces are applied. The use of unit loads permits standard fork trucks to be used for interplant transportation. More specialized are the forks and large processing drum, over 6 ft. in length, shown in Fig. 5. The load is lead covered cable and the truck transports the drums between operations, including the placing of them in vulcanizers where the rubber insulation is cured under steam pressure. Machine utilization has been increased materially as a result of the speed up of movement between operations, to say nothing of the actual labor saving. Besides, special carriers of this kind protect the goods in process.

The unloading of relatively light and fairly uniform corrugated boxes, bags, etc., containing incoming materials or the reverse instance in the loading of similar packages of finished products more economically, has been foremost in the minds of material handling men for some time. Improvements have been particularly desirable where the material to be unloaded is fed to a conveyor, taking it to storage, or where the finished products are transported from stocks to shipping rooms on conveyors. Fig. 6 shows the newest portable conveyor method for this type of work which has been placed on the market.

Fig. 7 shows a rather unique innovation of a tractor-trailer system, It should be noted that the tractor is the unit equipped with the hoist so that the tractor can duplicate this feat with any one of a fleet of trailers. The usual practice is to equip each trailer with a costly telescopic hoist, which results in a more cumbersome contrivance, having many limitations. This particular equipment was developed for handling industrial refuse and has aroused considerable interest in both industrial and transportation fields.

Another unusual application resulting from a redesign of equip-

FIG. 6—Portable conveyor performing a real job between conveyor and stock location. These combination belt and roller conveyors are individually motor driven.



ment is illustrated in Fig. 8. A truck for hauling scrap metals, equipped with facilities for efficient loading was evolved by adopting a principle employed in one type of sanitation truck. Naturally, equal cubical contents of scrap metal would weigh considerably more than garbage for which the body was designed. After giving consideration to capacities, dimensions and adaptability of standard hoists, it was worked out that a capacity of 3000 lb. in the rear loading hopper and a payload in the 9 cu. yd. body of 6 tons would serve the purpose to advantage. The major problem was one of mechanical design in connection with the tremendous leverage that would be developed at the end of the lifting arm. It was found desirable to raise the hopper and the body with separate hoisting mechanisms, the former having twin cylinders and the latter one cylinder. Both operations are controlled with one lever, however. No chains, sprockets, drive shafts or friction clutches are involved, thus reducing to a minimum the need for maintenance.

As a totally enclosed body was not necessary, a simpler tripping mechanism was employed for dumping the hopper. The shape of the rear hopper was changed so as to better receive skeleton scrap and a rather ingenious self-locking tailgate was incorporated. Fig. 8 shows the heavier body for handling scrap mounted on a standard dump truck chassis with both hopper and body in the raised or dumping position.

To serve this street truck, end dump live skid hoppers, with an exceptional balance characteristic, were developed. These are suitable for handling by either platform or fork trucks within the plant itself. The industrial truck transports the hopper from location in the manufacturing section to a transfer point where the scrap is dumped into the hopper of the street truck, as shown in Fig. 9. Upon arrival at the haling press, the load is emptied adjacent to the baling press hopper.

All of these illustrations are presented with the thought that they might prove helpful in solving some material handling problems or possibly suggest entirely different applications. In any event, an exchange of ideas and mutual thinking is bound to assist materially the battle of production just as it is responsible to no small degree for the leadership which our country has attained.

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FIG. 7

HOIST equipped tractor raising semi-trailer to 50 deg. dumping angle while at 90 deg. to trailer.

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FIG. 9—Truck shown in Fig. 8 (below) just after transfer of scrap from portable shop hopper.

o o o



FIG. 8

SCRAP truck with loading hopper and body in dumping position. Note automatic and self-locking tailgate.

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Automatic Arc Welding

By F. G. OUTCALT and J. M. KEIR
Linde Air Products Co., New York

ALTHOUGH a few nearly all-welded ships were built prior to 1936, the strongest impetus to the welding of self-propelled ocean-going vessels was provided that year when the Sun Shipbuilding & Dry Dock Co. built the virtually all-welded 521-ft., 18,500-ton tanker, *J. W. Van Dyke* for the Atlantic Refining Co. An important feature of this construction was the use, for the first time anywhere in shipbuilding, of the then new Unionmelt automatic electric welding process.

Generally speaking, however, manual arc welding is the method by which the largest proportion of all ship welding is accomplished today. It is perhaps the only method used for welding vertical seams or where welding must be done overhead on the underside of a seam. For much of the downhand welding, where weld metal is deposited in seams on a virtually horizontal surface, manual arc welding is also used, particularly where the seams are short, are difficult to reach, or are in relatively thin material which can be welded completely in one or two passes.

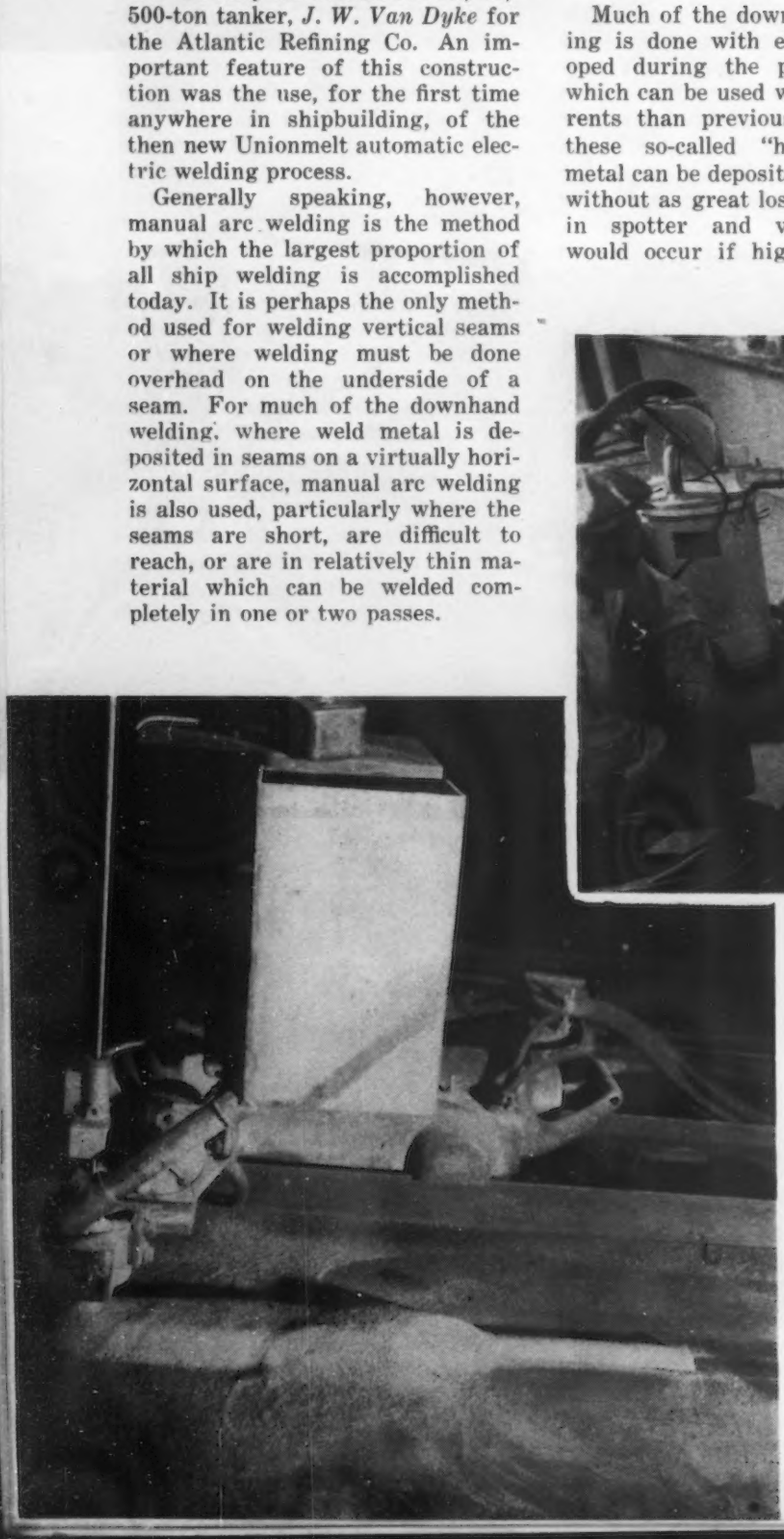
Much of the downhand arc welding is done with electrodes developed during the past few years which can be used with higher currents than previously used. With these so-called "hot" electrodes, metal can be deposited at high rates without as great losses of electrode in spotter and vaporization as would occur if high currents are used with ordinary electrodes. Current densities as high as 9000 amp. per sq. in. are recommended for these electrodes instead of the practical limit of approximately 6000 amp. for the all position "cold" electrodes.

This tendency toward more widespread use of the high-current electrodes has caused a decided trend toward higher capacity welding units such as the 400- and 600-amp., single-operator d.c. generators, the 500- and 750-amp. a.c. transformers, and the larger multiple-operator units. (See THE IRON AGE, Aug. 14, 1941, p. 52.) Multiple-operator units are generally used to supply



ABOVE

FIG. 2—Welding deck butt joints with a modern Unionmelt machine in which the rod is fed from 25-lb. coils. Weld currents up to 2000 amp. are possible with this type of equipment.



LEFT

FIG. 1—Simplified apparatus for making automatic arc welds by the Unionmelt process, using straight lengths of welding rod. The arc action takes place under the granulated Unionmelt material fed from a hopper and shown covering the completed weld for about a foot to the right of the welding zone. Some of the material fuzes over the weld, but is removed readily.

ngn Ship Construction

. . . A sequel to the article on "Plate Cutting in Ship Construction," published last week. The original material, of which this is a lengthy abstract, was presented in the form of a paper before the 1941 annual meeting of the American Welding Society, but has not heretofore been published.

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current to a greater number of operators than would be indicated from the rating of the equipment. Such apparent overloading has developed from experience which shows that because of the diverse activities of a number of operators, only a few are drawing their maximum required current at one time. Sometimes as many as 100 operators can be served by a machine of 5000-amp. capacity, even though each operator may sometimes use 200 or 300 amp. while actually welding.

Of the estimated 24,000 welding operators employed by the 50 or so U. S. Navy and private yards on the coasts and Great Lakes, about 1000 to 1500 are using oxy-acetylene welding equipment for the welding of brass, copper, aluminum and other special materials used in the equipment of ships. Much of the service piping is also oxy-acetylene welded. Oxy-acetylene heating is used for pipe bending and for straightening and correcting buckling which sometimes results from the welding of ship hulls decks, and superstructures. By far the greater number of all welding operators, however, are engaged in manual arc welding.

Unionmelt Process

An estimated 800 men, however, are operating automatic electric welding equipment with which metal can be deposited at a much higher rate of speed than is possible with manual arc welding equipment. With the Unionmelt process, an operator and a helper, welding with current densities of 14,000 to 30,000 amp. per sq. in., can feed welding rods through their equipment at rates of about 1/3 to 1 lb. per min., depending upon the thickness of steel being welded.

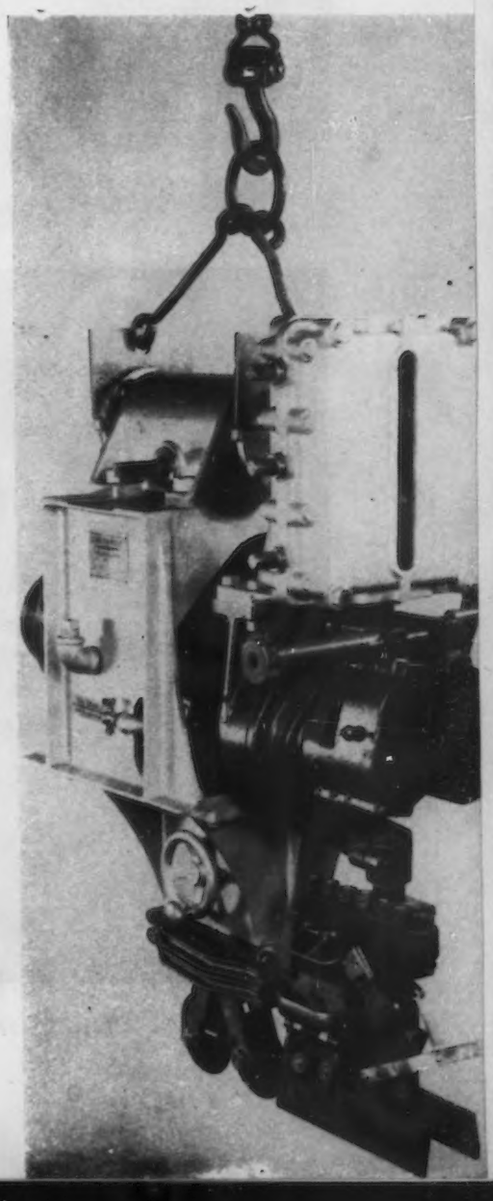
Because of the high current density and the high rate of heat input into the weld, there are several things about the preparation for welding and the Unionmelt welding procedure itself which are unusual. In some yards, butt-welds $\frac{3}{8}$-in. deep are being made in one pass in plate that is square-butted tightly together without any beveled preparation. When beveling is used, the Vs are smaller and the amount of metal required to complete the joint is much less than that required for the other welding methods commonly used. Therefore, the 1/3 to 1 lb. of rod melted per min. generally produces two to three times as much length of welded seam as would be produced with an equal weight of electrode used in other electric welding processes.

Shrinkage Factors Reduced

In spite of the high current densities used in Unionmelt welding, no excess heat is introduced into the joint because of the high speeds. Furthermore, the deep penetration of a single pass gives more uniform heating of the entire thickness of the joint and reduces the tendency to bowing of the welded pieces. Obviously, the fewer the number of passes, the less the cumulative shrinkage effect. Most types of joints are assembled for Unionmelt welding by simply butting them tightly together. All of these factors combine to eliminate the need for appreciable overall allowances for shrinkage.

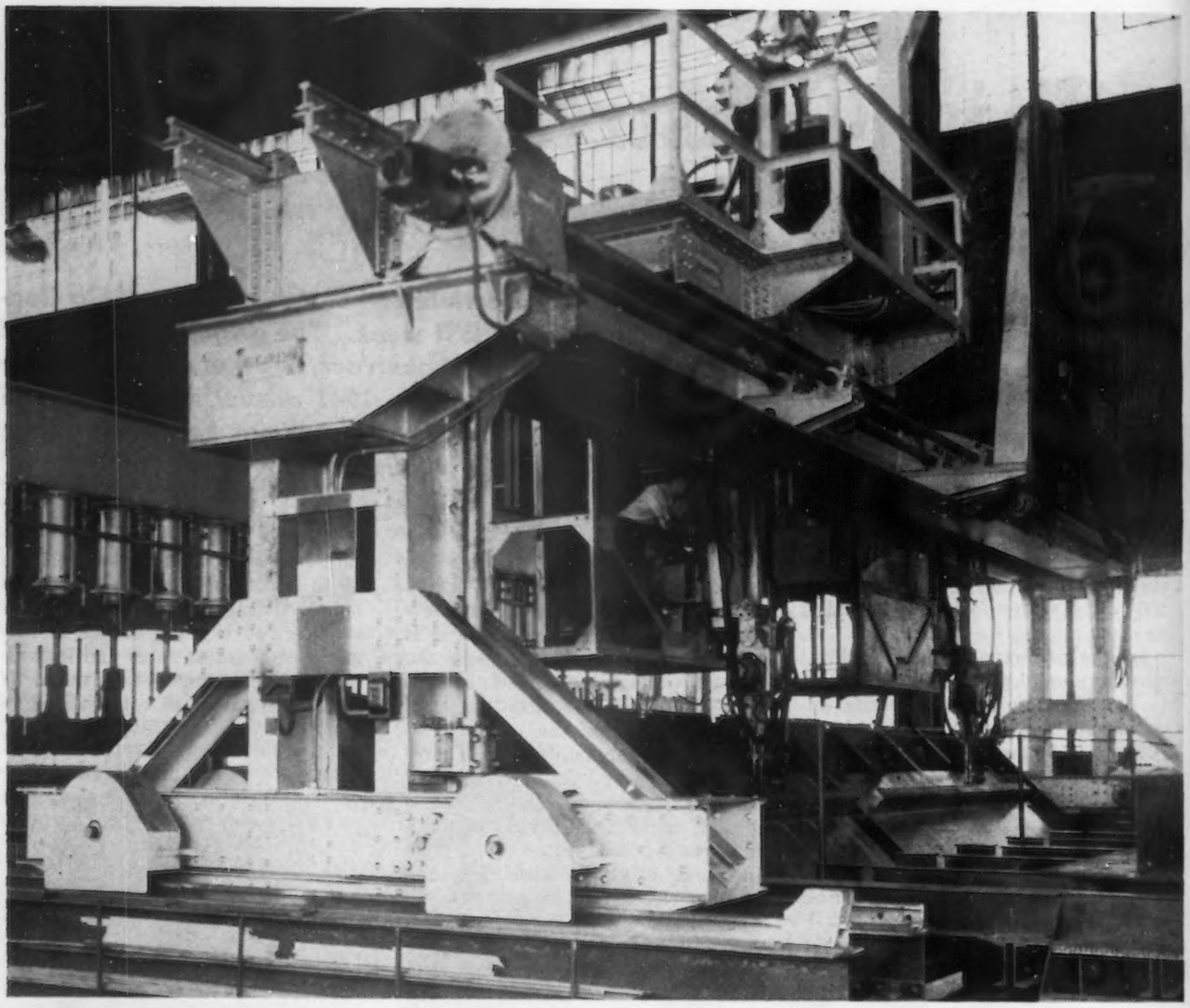
While the welding is going on, there is normally nothing to indicate even at close view that perhaps 30 to 90 kw. of electrical energy is being transformed to heat, that welding rod is being melted at formerly unheard of rates and that almost twice as much base metal as added rod metal is being fused to

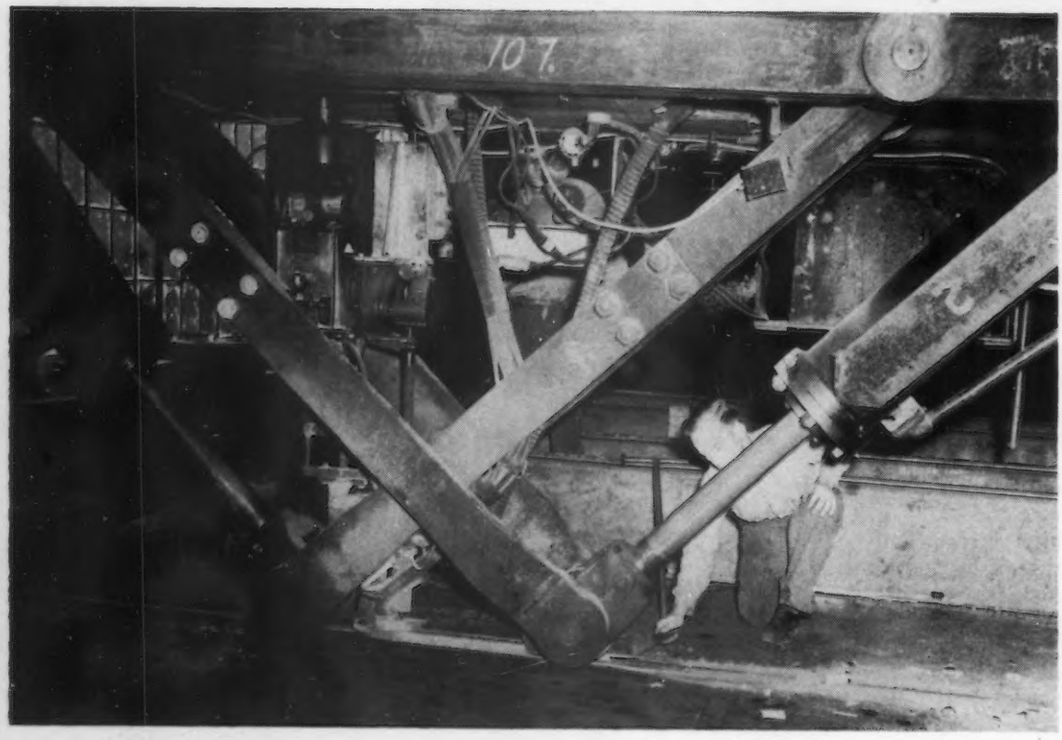
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RIGHT

FIG. 3—This large, heavy automatic welding head is capable of feeding as much as 4000 amp. of welding current to rod as large as ½ in. in diameter. Such a head is used with the huge supporting structure shown in Figs. 4 and 5.





ABOVE

FIG. 4—Part of the installation at the Sun Shipbuilding & Dry Dock Co. yard for welding large subassemblies automatically by the Unionmelt process.

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LEFT

FIG. 5—Plates for a butt weld are forced into alinement with these huge hydraulically actuated holddown arms. This is part of the Sun Shipbuilding installation.

form a homogeneous, deeply penetrated weld.

The medium which makes this possible is a granulated material of special properties which is fed by gravity through the welding head and laid along the seam to sufficient depth to cover completely the welding zone and the end of the bare steel welding rod. In Fig. 1, the unfused granulated Unionmelt is shown covering the completed weld for about a foot to the right of the welding zone. Further to the right, the unfused material has been removed and the fused portion of the Unionmelt is shown slightly lifting away from the surface of the finished weld as both weld and solidified melt cool. The unfused material can be retrieved for re-use.

Several methods are used to recover the unfused granulated Unionmelt. The simple dust-brush and pan used in some yards is less common than some form of "vacuum-cleaner" type equipment. Such mechanical equipment must be especially designed to withstand the action of the highly abrasive material, or vulnerable parts must be cheap enough to make frequent replacement economical.

Some Portable Types

The welding head shown in Fig 1 is a simplified, "stripped" unit suitable only for feeding straight lengths of welding rod for making welds requiring not over approximately 1000 amp. of welding current, which is about that required for making a fully penetrated weld ½ in. deep. This type of machine is simply constructed and easily portable.

The welding units of the type shown in Fig. 2 feed rod from coils of approximately 25 lb. weight and are used for making welds requiring up to about 2000 amp. Welds of about 1¼ in. thickness can be made in one pass with this machine. The equipment can be readily moved about on flat surfaces but must usually be handled by crane for longer moves. The machine is shown welding a deck butt joint. Sometimes four 500-amp. welding transformers are connected in parallel to supply the welding current to this automatic welding machine. Most yards, however, use 1000-amp. transformers either singly or connected in parallel. Generally, 440 or 220-volt, 60-cycle, single-phase current is supplied to the welding transformers, although a few installations use 2300-volt primary supply sources.

A few welding heads are supplied with direct current from standard welding generators. Regardless of the source of current, provision is made to make and break the supply current instantaneously at full load for starting and stopping a weld. A contactor operated from a small switch on the welding head is standard equipment. The contactor to control the welding current may be in the primary supply lines to the welding transformers, in the output circuit of d.c. generators, or if the generator field circuits can be isolated, a small contactor in the field circuit will suffice.

Extremely Heavy Machine

A large, heavy type of welding head which is in no sense portable was the first one used with Unionmelt welding. This head, illustrated in Fig. 3, must be mounted on a substantial supporting structure. It is capable of feeding as much as 4000 amp. of welding current to welding rod as large as ½ in. in diameter.

Two of these large heads were installed in 1936 in the Sun Shipbuilding & Dry Dock Co. yard. Since that time, many of the smaller units and additional large heads have been put in service there. The highly developed methods of construction, and the use of large auxiliary mechanical equipment especially designed for mass production of tankers, have led to a greater use of automatic welding than is found in any other shipyard. Figs. 4 and 5 show a part of the installation of the large automatic welding equipment. In all other yards, only the smaller, portable units have been used and good results are being obtained.

The use of this process in shipbuilding has been and will be an important factor in speeding welded construction. One operator and a helper can produce from 200 to 400 ft. per 8-hr. day of finished seam in steel of average ship plate thickness. Hence the use of this process releases many an arc welding operator for the greater amount of welding which on any ship is not adaptable to automatic machine methods.

Prefabrication is the principal field of application of the Unionmelt welding process, although in many yards the machines are taken onto the ways for the welding of shell bottom plating, tank tops and decks. Prefabrication includes the

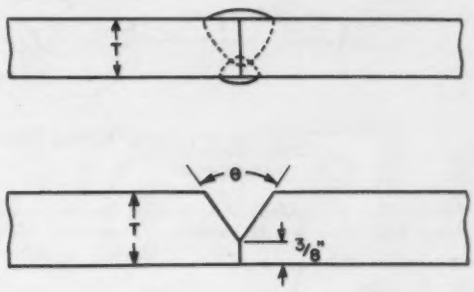


FIG. 6—Two-pass Unionmelt butt welds made with the joint backed with a platen or heavy structural shape for the initial pass. Upper: Straight butt joint for plate up to ½ in. Lower: V-butt for plate from 9/16 to 1 in., with 90 down to 45 deg. V angle in ascending order of thickness.

	Backing Pass					Finishing Pass					
			Speed	Welding Rod				Speed	Welding Rod		V Angle θ
T, In.	Amp.	Volts	In.-Min.	Dia., In.	Lb.-Ft.	Amp.	Volts	In.-Min.	Dia., In.	Lb.-Ft.	Deg.
¼	400	32	28	5/32	0.10	500	30	27	5/32	0.12	
5/16	420	32	28	5/32	0.11	550	30	26	5/32	0.15	
⅜	500	32	28	3/16	0.14	600	32	24	3/16	0.18	
7/16	600	33	24	3/16	0.20	700	35	22	3/16	0.25	
½	700	33	22	3/16	0.23	750	35	20	3/16	0.27	
						V-BUTT WELDS					
9/16	650	33	22	¼	0.21	900	31	20	¼	0.38	90
5/8	650	33	22	¼	0.21	950	31	18	¼	0.44	90
¾	700	33	22	¼	0.23	1000	33	16	¼	0.50	75
⅞	700	33	22	¼	0.23	1100	35	14	¼	0.60	60
1	700	33	22	¼	0.23	1200	35	12	¼	0.75	45

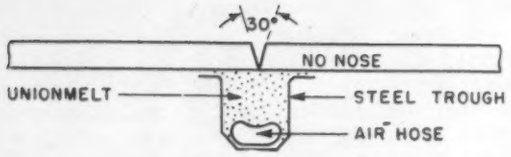


FIG. 7—Melt-backed Unionmelt butt welds. Up to 5/16 in. the edge preparation is square; from 3/8 in. and above, a simple V as shown without nose is used. The backing melt is 3 1/2 in. deep above a 3 1/2-in. diameter fire hose through which cooling air is blown under pressure of 35 to 70 lb. per sq. in., the higher pressure being used for the thinner plate.

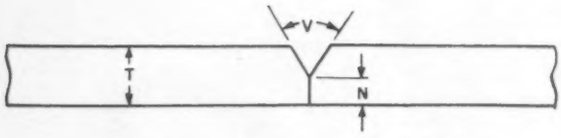


Fig. 8—Copper backed Unionmelt butt weld.

T, In.	V, Deg.	N, In.	Amp.	Volts	Speed In.-Min.	Welding Rod Dia., In.	Lb.-Ft.
3/16	60	1/8	500- 575	28-31	29-35	3/16	0.11-0.13
1/4	60	1/8	725- 825	29-32	26-31	3/16	0.14-0.23
5/16	60	1/8	775- 900	30-33	26-29	1/4	0.25-0.30
3/8	60	1/8	900-1000	32-36	24-27	1/4	0.28-0.35
7/16	60	1/8	1000-1100	32-36	22-25	1/4	0.33-0.40
1/2	60	3/16	1075-1175	34-37	20-23	1/4	0.38-0.45
5/8	45	3/16	1150-1250	35-38	16-19	1/4	0.50-0.58
3/4	45	3/16	1200-1300	36-39	13-14	1/4	0.60-0.75
7/8	40	1/8	1375-1500	38-40	11-13	5/16	0.80-0.95
1	35	1/8	1500-1600	39-41	10-12	5/16	0.90-1.10
1 1/8	30	1/8	1575-1650	39-41	9-10	5/16	1.00-1.25
1 1/4	30	1/8	1600-1700	39-41	8- 9	5/16	1.25-1.60
1 1/2	30	1/8	1900-2000	40-43	7- 8	3/8	1.85-2.00

welding of sections of tank tops, shell plating, bulkheads, shaft alleys and decks, as well as sections of superstructure and king posts and booms of cargo-handling equipment.

Butt welds and fillet welds are the types principally made. Smaller fillets of less than about 3/8-in. leg dimension are frequently made without positioning the pieces, but the large fillets tend to sag, and the pieces must usually be tilted so that the diagonal surface of the weld will be approximately horizontal.

In the making of butt welds, full advantage of the deep penetration of Unionmelt welding and its consequent capacity to weld considerable thicknesses in one pass cannot be taken unless some means is provided for supporting the molten metal from the under side. Several methods of backing welds and of combining manual arc welding and automatic Unionmelt welding are indicated in the accompanying sketches of various types of joints used in shipbuilding.

Both types of joint illustrated in Fig. 6 require tightly fitted edges to prevent the weld metal from flowing through, but for plate thicknesses less than 1/2 in., contact with a platen or structural members on which the sub-assembly is laid is usually needed for additional chill to control the fluid metal. The edges must be straight and fitted tightly enough to exclude a shipfitter's feeler. If mill sheared edges are used, it may be necessary to grind or otherwise condition the edges to obtain this result. The weight of the plates assembled on a platen is usually sufficient to maintain satisfactory contact, but it may be necessary to hold them down by weights, roller or structural means.

Fig. 7 shows a melt-backed Unionmelt butt weld.

The joint shown in Fig. 8 requires uniformly close and tight contact between the underside of the seam and the copper backing to prevent the weld from running out. Uniformly sound welds require removal of all surface scale, rust and other material so that clean metal is exposed on the surfaces in contact with the copper-backing up means.

For the joints shown in Figs. 9, 10 and 11, manual welds replace the initial Unionmelt weld of the joints shown in Fig. 6. The manual weld must be sound, uniformly reinforced, and of a depth (measured by penetration plus reinforcement) at least one-half the plate thickness for plates up to 1/2 in. thick in order adequately to back the finishing Unionmelt weld and assure complete overlapping.

With the joint shown in Fig. 12, the steel backing bar should bear uniformly on the underside of the seam in order to prevent fluid metal from running out. If considerable variation in edge-bevel and edge-distance is encountered, it should be compensated for by variation in welding speed to maintain desired reinforcing. The distances between the edges and the bevels tabulated are the minimum allowable.

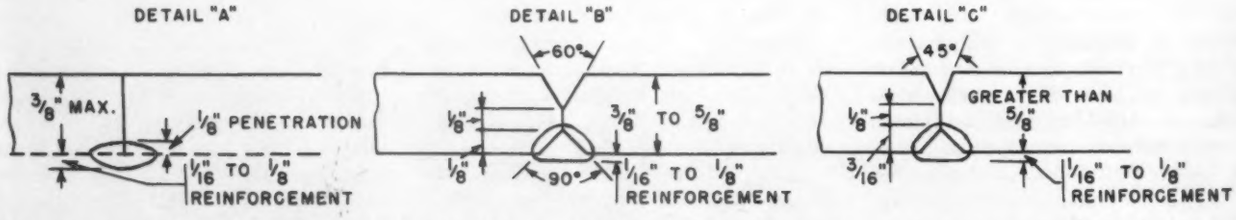


FIG. 9—Manual weld-backed Unionmelt butt weld with manual weld deposited in downhand position and plates turned over for automatic welding. (A) For plate 3/16 to 3/8 in.; (B) for plate from 7/16 to 5/8 in., and (C) for plate from 3/4 to 1 in.

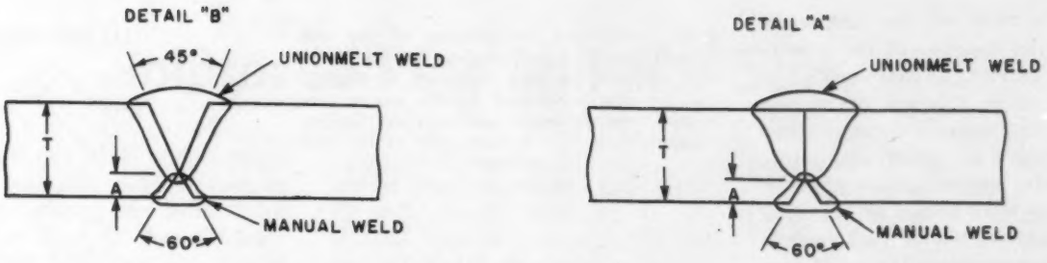


FIG. 10—Same as Fig. 9, but with manual welds deposited overhead. The simple butt joint shown at the right can be used only with plate thicknesses up to 3/16 in. Dimension A varies from 1/8 in. for 1/4-in. plate up to 1/4 in. for plate from 1/2 to 1 in. thick.

If the fillet weld joints shown in Figs. 13 and 14 are not fitted tight, some method of damming the molten metal must be employed so as to prevent a runout. Cleaning by grinding or wire-brushing of the surfaces to be welded will permit the use of highest welding speeds and help to produce uniformly sound welds.

Procedures differ in detail in various shipyards, but generally the assembly of sections of hull, inner bottoms, bulkheads and deck starts with the laying of the prepared plates on a large platen or on a skeleton table made of T-bars, I-beams or other structural steel shapes. Partly penetrated automatic welds are then made and the stiffeners are fillet welded to the plate. The assembly is then turned over and automatically welded from the other side, with ample penetration into the weld previously made from the first side.

Frequently, the hull bottom plates are laid individually on the ways, an overhead weld is made on the underside of the plate by manual arc welding and, with this as backing, a Unionmelt automatic weld is made from above. Similar procedure is often used in applying deck or tank top plating, although sometimes the plate joints land on a flanged structural member or are fitted with a steel backing strip, and a weld with cross-sections like those shown in Fig. 15 is made.

Plug Welding

Plug welding is an operation of ship construction for which the Unionmelt process is well suited. Recently one shipbuilder found it was possible to produce as many as 76 plug welds per hr., with one portable Unionmelt welding machine, fastening 1/2-in. tank top plating to the flanges of angle iron supporting structures. Fig. 16 shows a typical section of a plug weld. Simple, light-weight, hand-operated equipment has recently been introduced to facilitate plug welding.

With all methods of welding, cleanliness of plate edges and weldability of material are vital to success. Manual metallic arc welds are often made with fair success but with questionable economy on plate which is wet, oily or dirty. Such conditions, however, are usually not tolerated.

In Unionmelt welding, freedom from gas-forming contaminants in the fusion zone is particularly im-

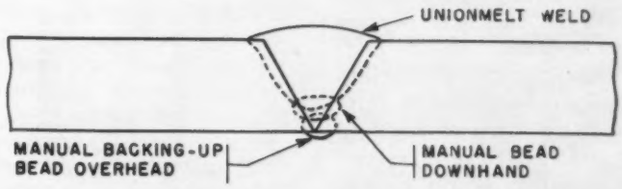
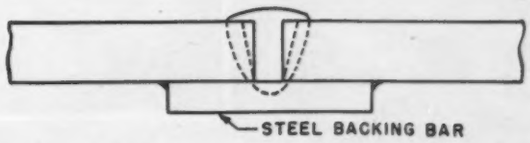


FIG. 11—Combination overhead and downhand manual weld-backing for a Unionmelt butt weld. The top manual pass should be thoroughly cleaned of slag before automatic welding is started.

Plate Thickness In.	Edge Prep.	Min. Spacing In.	Min. Thickness Backing Bar In.
1/4	Square	3/16	1/4
5/16	Square	3/16	5/16
3/8	Square	3/16	3/8
7/16	30° V	1/4	3/8
1/2	30° V	3/16	3/8
9/16	30° V	3/16	7/16
5/8	30° V	3/16	1/2
3/4	30° V	3/16	1/2



Immersion time and coating ductility. Zinc at 850 deg. F., and at 200 diameters magnification.

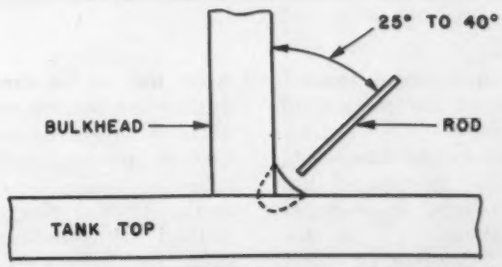


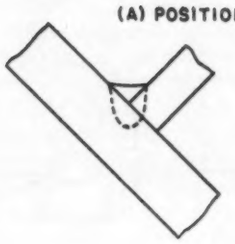
FIG. 13—A typical non-positioned Unionmelt weld, used for joining bulkheads to tank tops, etc.

portant because of the unusually high welding speeds and the resulting rapid rates of initial cooling of relatively large volumes of molten metal in the weld. Contaminating materials such as water, oil, paint, heavy scale and rust are usually removed by wire brushing or rapid surface heating with a concentrated oxy-acetylene flame. If the plates are carefully protected and the work of assembly and welding is properly organized, however, a light wire-brushing just before welding will be the only surface preparation needed.

Steel of questionable weldability is occasionally encountered in shipyards, and has sometimes required special procedures. Care in assembling and cleaning, slower speeds, higher quality welding materials or perhaps additional passes of

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FIG. 14—Where the thickness of the web plate is equal to or less than the size of the fillet leg, with the work positioned at 45 deg., 100 per cent penetrated T-joints can be obtained if the following conditions are fulfilled in applying a fillet to each side of the web plate:

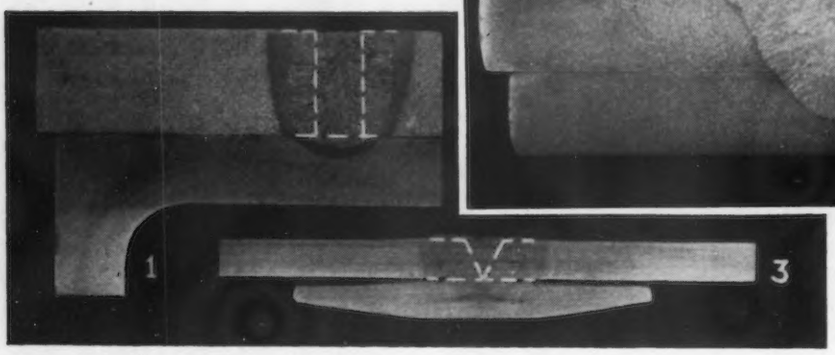


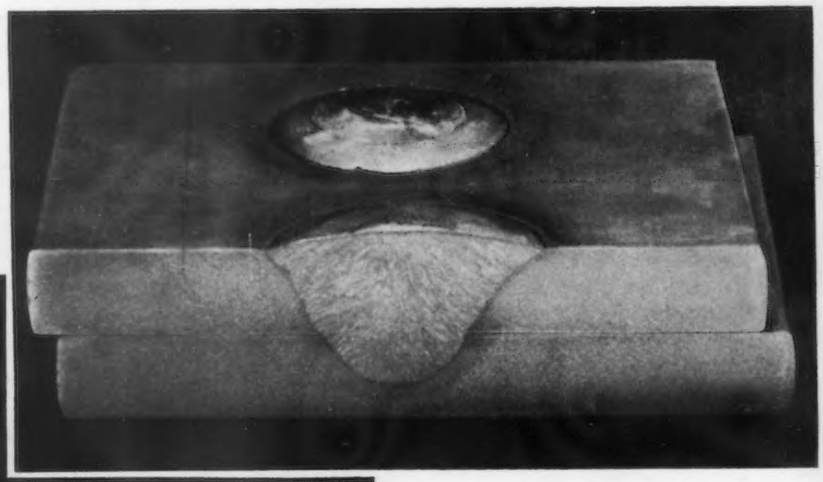
Normal Fillet Size, In.	Amp.	Volts	Speed In.-Min.	Welding Rod Diam., In.	Lb.-Ft.
1/8	400	27	36	1/8	0.04
3/16	500	27	32	1/8	0.07
1/4	650	27	28	3/16	0.11
5/16	650	28	22	3/16	0.17
3/8	750	29	18	3/16	0.25
7/16	850	31	16	1/4	0.43
1/2	950	31	13	1/4	0.66
5/8	1080	31	11	1/4	0.95
3/4					

o o o

BELOW

FIG. 15 — Cross-sections of welds made where the plate joints land on a flanged structural member or are fitted with a steel backing strip.





ABOVE

FIG. 16—Section of a plug weld made with automatic equipment.

welding, tend to improve the results regardless of the method of welding being used.

Looking ahead to the immediate future, it seems inevitable that manual and automatic processes of welding, manual and mechanized methods of flame-cutting and older shearing, punching, reaming, bolting, riveting and calking processes will all be used to the limit during the coming months, for the nation's shipyards are being called upon to produce 4,000,000 tons of cargo shipping per year by 1943, and a doubled Navy by 1947. No method of construction will be overlooked in this emergency effort, provided it produces the maximum results with the equipment and manpower available. But undoubtedly, out of this situation calling for the utilization of all processes, will come valuable comparisons and technical production data which will guide us in choosing the most economical and efficient methods of building ships in years to come when world conditions again return to normal.

▲ ▲ ▲

Improved Pipe Mill Hot Saw

ALTHOUGH the Fretz-Moon process has been in use in this country and abroad for a number of years, it was not until recently that a hot saw for cutting pipe made in these mills to more uniform lengths was developed. The general layout of a continuous butt-weld pipe mill is shown schematically in Fig. 1. The skelp is taken from a coil box through a roller leveler and then to an upcut shear where the ends of each coil are squared, butt-welded by an electric flash welder and the weld trimmed by the flash trimmer. The skelp then proceeds to the continuous furnace where the edges are heated to the proper temperature. From the furnace it is drawn through the mill, usually consisting of three pairs of vertical rolls and three pairs of horizontal rolls, which form and weld the skelp into pipe. The pipe is then cut into desired lengths by a hot saw, passes to the cooling racks, then to a descaler, and is finally sized and finished for shipping.

The usual drive of this mill consists of a single motor coupled to each of the six roll passes by a lay shaft and to the hot saw driving mechanism by a clutch, has been replaced in the new arrangement with a motor to drive the roll passes and a separate motor to drive the hot saw. Both the mill driving motor and the saw carriage motor are operated from a variable voltage system, built by Westinghouse Electric & Mfg. Co., East Pittsburgh, permitting the speed of the saw carriage to be changed simultaneously with that of the mill. The saw carriage on this new mill was made continuously reciprocating.

The new arrangement permits closer tolerances of cut-off for pipe coming from the mill, and cut lengths do not vary with the speed of the mill, which must be changed to control the temperature of the skelp.

Another inherent error of the former drive has been eliminated by placing the saw carriage driving motor on the variable voltage system. With the former drive, the carriage had to be accelerated from rest by a clutch and any change in the mill speed had to be transmitted to the saw drive by this clutch. Because of clutch slippage, error in operation was introduced, which varied over wide limits determined by mill speed, condition of the clutch, length of pipe being cut, and frequency of operation.

Instead of using the flag switch to initiate the cutting cycle, as was formerly done, it is now a matter of properly sequencing the control. A rocker arm, shown in Fig. 3, was inserted in the crank linkage to the carriage, and the length of the stroke made by the carriage is adjusted by changing the radius of the rocker arm. The screw in the rocker arm, being motor operated, can be adjusted at any time while the system is in operation. The pipe length being cut is set by adjusting the carriage to the proper length of stroke and then sequencing the control so that the saw makes a cut every stroke, every second stroke, or as may be required to produce the required length. The saw was built so that the length of pipe cut can be varied from about 62 to 609 in.

A speed matching regulator is connected between the last pair of rolls of the mill and the saw carriage to insure that the speed of the pipe and the saw speed are always the same. With this arrangement, the variance in lengths of pipe cut is considerably less than by any previous cut-off method. The carriage, being always in synchronism with the mill's speed, holds the variation to less than ½ in. on short lengths, and 2 in. on long lengths.

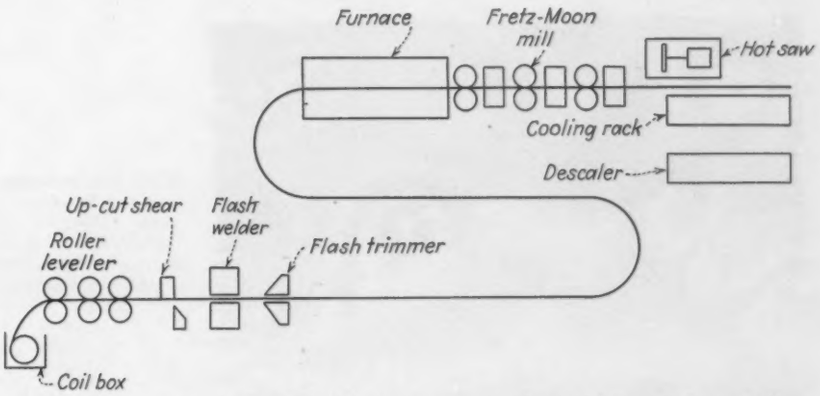


FIG. 1—Layout of the Fretz-Moon continuous butt-welding pipe mill, before changes were made in the hot saw design.

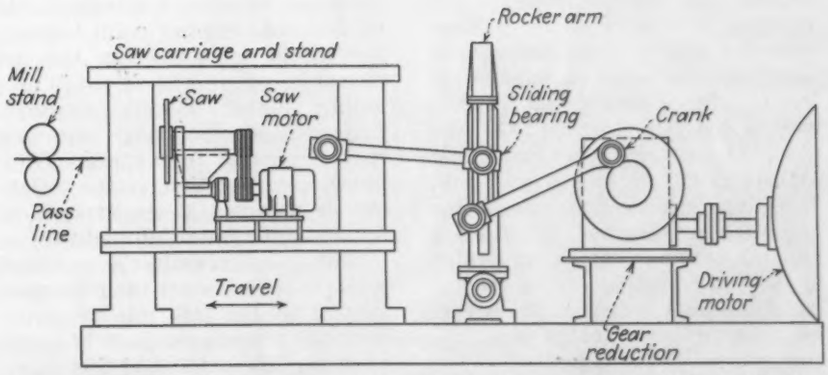
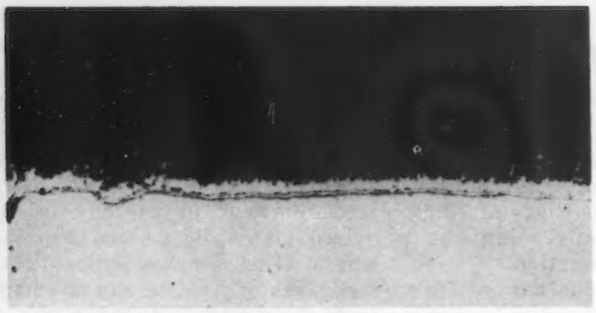
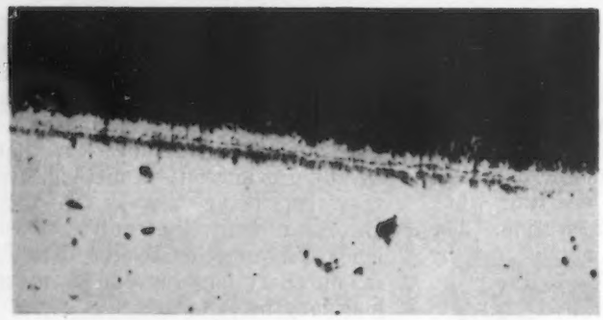


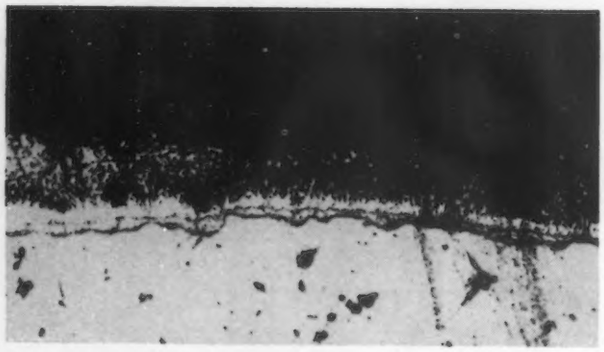
FIG. 2—Schematic drawing showing the automatic hot saw driven by a separate motor. This new arrangement permits tolerances to ½ in. on short lengths and 2 in. on long lengths.



(A) 55 sec. immersion, excellent ductility.



(B) 2 min. immersion, good ductility.



(C) 3 min. immersion, good bending.

Hot Galv

. . . Now, if ever, the galvani... of modern practice reaps his... vanize the maximum number... the limited zinc supply avail... by being able to obtain ser... effort is made to reduce dro... further...

THE present emergency is affecting the daily lives of the American people in so many obvious ways that it seems necessary to stop and study some of the conditions attributed to it. It is claimed, for instance, that hot galvanizing will have to be reduced from five dips to three dips to save zinc, and will result in hot galvanized articles of poorer quality. It is hard to understand why it is so popular to describe hot-galvanized articles as having had several dips. Hot dipping more than once is the exception rather than the rule in general practice. More important is the consideration of hot-galvanizing practices to acquire the greatest area properly coated with the zinc allotted to the industry.

Hot galvanizing practices, equipment and materials have been intensively studied in recent years with the objective of producing zinc coatings of serviceable thickness, adherence, ductility and protective value. The advances have been notable, and it would be unfortunate if the idea that repeated dippings produced superior coatings should be fostered. Studies point towards brevity of immersion in the hot zinc as being a major factor in providing higher quality coatings. Likewise, zinc coating thickness that may result from repeated dippings or longer time in the molten zinc is obtained at the expense of other equally essential qualities.

The hot galvanizer's constant problem is to convert the maximum amount of the zinc into the most serviceable coatings. Loss of metal as dross, zinc oxide, and flux skimmings must be kept at a minimum. A control method used broadly is the record of correctly galvanized work requiring but one dipping in the zinc pot. The present purpose is to discuss in general terms many factors that influence these results. Care in selecting equipment, materials and procedures leads to the results desired.

Control of Thickness

Hot galvanized sheets, strip, wire and pipe have their zinc coating thickness determined in part by various mechanical wiping means. Bolts, nuts, nails and many similar articles have molten zinc removed by being spun in centrifuges or slowly rotating steel cylinders. Zinc coating thickness is not controlled by so-called "stripping" operations in hot oils or the like, because the high melting point of zinc limits this possibility.

Wringer rolls are commonly used to control coating thickness on sheets and to some extent on strip steel. Blasts of air or steam are almost universally used on pipe and under some circumstances on strip. Wire is tight or asbestos-wiped and charcoal-wiped. The use of asbestos pads controls coating thickness for lighter coatings, and charcoal is used for heavier coats and for many forms of woven wire products. Centrifuges, which may include gyroscopic or planetary principles, are used on small articles, and large diameter rotatable steel cylinders, equipped with baffle plates and water-quenching nozzles, are used for items such as pole line hardware.

Each of these mechanical devices

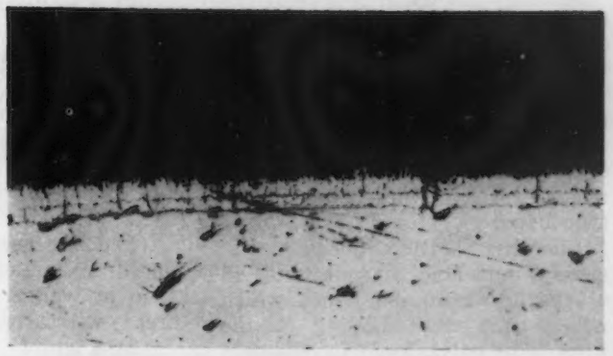
alvanizing

zer is alert to the possibilities reward. He is able to gal- of units of his product from able. The public is benefited viceable galvanizing, and, as ss and ash formation, all will benefit.

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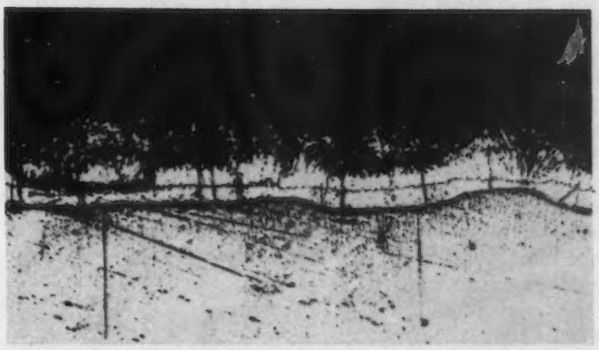
By ALLEN T. BALDWIN
Chemical Engineer

o o o



(D) 4 min. immersion, coating flaked slightly on bending.

o o o



(E) 5 min. immersion, coating peeled on bending.

o o o



(F) Immersion time long and unknown, and coating peeled badly on slight bending.

is subject to such control, so will vary the zinc coating thickness within limits peculiar to the respective devices and products being coated. With all mechanical control devices and all products, the common factor influencing the final result of hot-zinc galvanizing is the fluidity of the zinc coating at the time that excess zinc is removed. This factor is very important, whether the excess zinc is removed by some so-called "wiping" device, or by merely allowing it to run or drip off the hot-galvanized articles.

The actual zinc coating consists of an outer layer of substantially pure zinc and successive inner layers of zinc-iron alloys whose iron content increases as the basis metal is approached. The outer, or zinc, layer possesses fluidity that permits "wiping." The alloy layers, on the other hand, lack that characteristic which would cause them to reform readily and present a continuous, homogeneous surface after being wiped. There is an apparently well founded prejudice against hot galvanizing where the alloy layers are exposed and have been deformed as produced. Apparently less service life is obtained under such circumstances.

The procedure followed in order to obtain a satisfactory zinc fluidity for wiping is therefore pertinent. The use of higher temperatures is the first thought of many operators; this procedure seemingly accomplishes desired results. When, however, increased fuel costs, shorter kettle life, greater dross and oxide losses, thicker alloy layers of poorer adherence and ductility are all taken into consideration, the final answer is to condemn high temperatures.

Experienced galvanizers recognize that certain rough coats are caused by drossy or high iron content zinc. One of the simpler, more profitable ways of obtaining suitable fluidity for wiping, therefore, is to keep the iron content of the molten zinc as low as possible. At times aluminum additions restore fluidity, but only small amounts should be used because zinc alloys slightly high in aluminum are pasty. The addition of tin or lead also helps by lowering the freezing point so that the work can be done at lower temperatures, giving more time for wiping before freezing of the coat takes place.

The dimensions of the zinc kettle and its heat application are important factors in dross production and distribution. Here again, the popular conception of hot galvanizing as being a simple dipping operation leads to costly errors in equipment

design. Experience proves that an extremely high reserve of heat stored in the molten zinc leads to longer kettle life and lower dross production. Heat of a maximum value of 10,000 B.t.u. per sq. ft. per hr. for the side wall in the pots under fire have worked out advantageously.

Choosing kettle dimensions is more complicated than deciding on a length, width and depth which will permit mere dipping of the work to be galvanized. Care should be exercised to keep the surface that will be exposed to air as small as is practicable, but the depth should be chosen finally by the factors described. A large weight of zinc held molten as a heat reserve is both an economic and technical advantage. In the long run, zinc is saved in the sense that, after the plant is started, more of the metal melted to maintain operations actually appears as the zinc coating intended for the steel being galvanized.

All too common are plants where production requirements have exceeded the kettle capacity with regard to heat demand. The first move in many such plants is to try to drive more heat into the kettle by increasing the operating temperature 10 to 20 deg. F. The result is more dross, more zinc oxide, poorer quality coats, and shorter kettle life, all adding up to wasted zinc. It should be noted that today kettles under constant use are lasting four years or longer in many plants.

Zinc Losses

The relation of the production of dross, zinc ash and flux skimming to the zinc used in current hot galvanizing practice is shown in Table I. These data were tabulated in the 1940 report of the American Bureau of Metal Statistics which covers the galvanizing of 3,559,914 tons in various classifications, using 279,901 tons of zinc, and producing 36,178 tons of dross and 38,734 tons of skimmings and ashes.

Interpretation of these data calls for consideration of such matters as:

(1) Zinc used and dross produced are influenced by area rather than by weight galvanized and increase with area.

(2) Lighter objects requiring shorter heating time in the molten zinc contribute less iron to the kettle to form dross.

(3) Those classes of products showing the lowest production of ashes and skimmings are characterized by having substantially the entire kettle top covered with flux or other blanket constantly. These factors, therefore, are controlled largely by the necessity for having large areas of molten zinc exposed directly to the air.

(4) The ashes and skimmings data would be more useful if these two items had been reported separately due to the dissimilarity between the two materials. Ashes are largely a form of zinc oxide, which may contain as much as 80 per cent zinc, while skimmings are the residue from the volatile flux and generally contain from 50 to 55 per cent zinc. Skimmings containing more zinc are generally mixtures of these two by-products. Dross, in general, contains 95 to 98 per cent zinc, so that the 36,178 tons of dross reported means at least 34,000 tons of zinc, and it is this figure that should be kept in mind when considering possible methods of reducing dross formation.

The control of the formation of dross and zinc ashes, as well as the selection of such items as fluxes, fluxing methods, rinsing methods and the blanketing of exposed molten zinc, take on added significance. Blankets of such diverse materials as crushed slag, coke, charcoal and zinc oxide are frequently used. Recently there have been favorable reports concerning fluid, fused blankets. Less heat loss and greatly lowered oxidation of the molten zinc to form ashes seem to pay well for the attention blankets require.

Flux skimmings are the residue of the spent, volatile flux, and their chlorine content generally makes them unattractive in secondary metal markets. The use of muriatic acid as a flux wash and sal ammoniac as a volatile kettle flux is an older method that is still used almost exclusively in galvanizing sheets. Reference to Table I will show 14 lb. of ashes and skimmings produced per ton of sheets galvanized. In reality these 14 lb. are flux skimmings resulting from the reaction between the sal ammoniac used and the molten zinc and, approximately, account for seven of the 169 lb. of zinc used per ton of sheets galvanized. In all other classes shown here, considerable galvanizing is done by an alternative method, namely the use of either No. 20 flux or other types of zinc ammonium chloride as the volatile kettle flux, and in the form of water solution as the flux wash. The zinc ammonium chloride used in these more modern fluxes contains about 22 per cent zinc and leads to a material reduction in the conversion of the molten zinc to form flux skimmings.

Replacing the muriatic acid by a No. 20 or similar zinc ammonium chloride flux wash is a major step in reducing the formation of dross because it permits the control of the contamination of the molten zinc by iron, as chloride or sulphate. Sheet galvanizing, therefore, since it uses about 50 per cent of the zinc melted and produces about 40 per cent of the dross and 30 per cent of the skimmings, would appear to be one field open for profitable improvement in the creation of these by-products.

What may be considered good practice with regard to the conditions that divert the zinc melted to other uses than coating can not be settled in any single discussion. That conditions have improved and are improving is attested by

TABLE I

Product	For Each Ton Galvanized — Zinc Used, Lb.	Dross Made, Lb.	Ashes and Skimmings Made, Lb.	For Each 100 Lb. Zinc Used — Dross Made, Lb.	Ashes and Skimmings Made, Lb.
Sheets	169	16	14	9	8
Pipe and tubes	170	25	46	15	27
Wire	82	15	13	19	16
Wire cloth	476	61	42	13	9
Structural	129	25	31	20	24
Sheet wares	405	29	53	7	13
Pole line hardware	161	42	46	26	28
Other castings	205	71	39	35	19
Miscellaneous	204	43	31	21	15
Undistributed	141	32	40	23	29
WEIGHTED AVERAGE	158	20	22	13	14

All figures are nearest whole numbers.

the performance records in many fields in recent years where the use of No. 20 flux and similar zinc ammonium chlorides, is regular practice. In galvanizing pipe, for instance, about 150 lb. of zinc are necessary, producing 18 lb. of dross and 30 lb. of ashes and skimmings per ton galvanized. Similar figures for structural steel would be 120, 20 and 25 lb., respectively. Malleable fittings, a big item in the castings field, use 130 to 150 lb. of zinc and produce 35 to 50 lb. of dross per ton galvanized. Similarly, in the other product classes of the table, many galvanizers are doing their work so as to meet coating specifications at figures much less than the averages shown.

The illustration, clearly shows the influence of time in the molten zinc on some essential features of the zinc coating. As immersion time increases, the thickness of the alloy layer increases and, adherence and ductility decrease.

Foundry Supplies Handled on Pallets

USE of the fork truck and pallet system for handling foundry materials is used extensively in the foundry of Pontiac Motor Division of General Motors Corp. to eliminate rehandling of foundry supplies, particularly cupola blocks and rough cut stone for relining and repairing cupolas. Since the system has been installed, time of unloading, transporting and putting into storage has been greatly reduced and handling made easier.

Cupola blocks and rough cut stone are piled evenly and strapped on pallets by suppliers before shipment, in accordance with specifications set up by Pontiac. Eighteen to 20 loaded pallets have been found to make up a boxcar load of approximately 35 tons.

The new method has reduced the number of tons of materials handled from 105 tons to 35 tons per carload, since the number of rehandlings has been reduced.

A substantial savings in space is reported due to the tiering of pallets to a height of 10 ft., the floor space savings amounting to about 33 1/3 per cent.

Unloading operations make use of a fork truck, which picks up loaded pallets one at a time. It takes less than one hour to unload a boxcar and store the materials without any manual handling being involved. When a supply of the material is required at the cupolas the fork truck is again used for lifting and transporting.

Pontiac is also using the fork truck and pallet system in the foundry for tiering up bagged materials, and expects to extend the system to other classes of foundry supplies if possible.



FORKED trucks pick up a pallet of cupola blocks, move it into the storeroom and tiers it, eliminating costly and slow manual labor. Note how tiering permits use of all space between floor and ceiling.



STACKING of such foundry supplies as cupola blocks, flour and core oil at the Pontiac plant has reduced the storage space required by one-third, in addition to eliminating needless rehandling costs.

Fixed Burnishing

By W. H. YOUNG
N. Ransohoff, Inc., Cincinnati

. . . Helpful suggestions on fixed and free burnishing of small parts, various types of burnishing equipment and burnishing solutions.

IN his paper, "The How and Why of Burnishing,"* F. T. Mann stated that no treatise on burnishing would be complete without touching upon the subject of fixture burnishing; or, as it is more popularly termed, "fixed burnishing." It is the purpose of this paper to elaborate somewhat on Mann's remarks on the subject, and to defend the use of fixed burnishing in the metal cleaning industry, and, if possible, to create more interest in a method of metal finishing that up to now has been largely derided by burnishing specialists.

**THE IRON AGE, Aug. 1, 1940*

The purpose of fixed burnishing is to finish work of such a size and shape that it cannot be free burnished without deformation or scratching. The usual answer to the question of how to finish fragile, large or odd shaped work is that it must be buffed with a wheel. However, if a hard, smooth, cold-worked surface is desired, then burnishing will give results that are far superior to wheel finishing. A buffing operation tends to remove the top layer of metal and leave a surface that has thousands of cuts and scratches per inch. Burnishing, on the other hand, produces a peened and cold-worked surface, closing all of the pores in the surface or "skin" of the metal, thus making the surface much more resistant to corrosion than the scratched surface obtained by buffing.

Fixed burnishing may be divided into two classes: (1) That group wherein the work is mounted on racks which in turn are put into the barrel in such a manner that they cannot move, and (2) that classification wherein the barrel is packed full of work in such a manner that the work cannot move. The first method is used almost exclusively, because it is seldom that an article will be found that can be packed in a barrel and yet cannot be free burnished.

It would be well to understand the mechanics of fixed burnishing, especially for the first class of work, which deals with racked work. A rack or fixture is usually made along the lines of the one shown in the sketch, Fig. 3. As can be observed, the rack is about the same size and shape as the inside of the burnishing barrel, and thus is prevented from practically all movement. The material that makes up the fixture has a bearing surface which is as small as possible. That is, the space between the wall of the barrel and the bars of the fixture is kept at a minimum to prevent, as much as possible, the jamming of burnishing balls, and the subsequent difficulty in removal of the fixture from the barrel. The work is mounted on the rack by means of screws or lugs, or any other convenient method that will enable the operator to remove the finished work and to reload the rack with unburnished work.

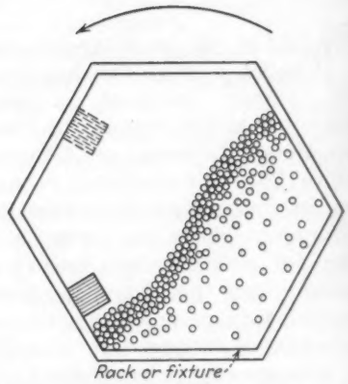


FIG. 1—In burnishing soft metals, the burnishing balls will work a "ball pattern" into the parts if the barrel is filled only to the extent illustrated here.

For the purpose of clarity, we will figuratively rack one piece of work and try to assume what happens during the fixed burnishing operation. An average case would consist of a rectangular brass block with rounded corners. For simplicity only, one piece of work will be considered. If the barrel is only half full of balls (as is all too often the case), when the piece of work comes around to the point where it just meets the balls, as shown in Fig. 1, the plane side of the work will be parallel to the wall of balls.

FORTY-SECOND in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

While this is not especially important in the case of steel or the harder brasses, it becomes tremendously important when working with the softer brasses, copper, aluminum and other soft metals. It can readily be seen from the sketch that, when the work first meets the balls, there is a ploughing motion of the work through the balls. The balls will be in the same relative position every revolution and thus the same section of work will receive the same portion of a ball every revolution. When this is repeated 15 to 30 times a min. for an hr. or more, the soft metal will take on a "ball pattern." This "ball pattern" can easily be avoided by filling the barrel three-quarters or more full of balls. Fig. 2 illustrates that when more balls are used, they will pass the work in a sliding motion instead of the ploughing or

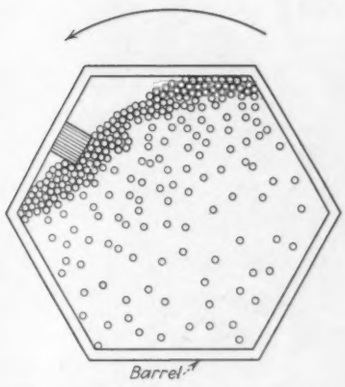


FIG. 2—By filling the barrel almost full of balls, the "ball pattern" will be avoided in the burnished work, as the balls will slide past it instead of ploughing into the forward face.

"slapping" motion formerly effected. Of course, there is quite a bit of slipping and rubbing when just a few balls are used, but this occurs only after the work has entered well into the mass. By using more burnishing material, the work receives rubbing for a much longer period of time.

Large balls or burnishing shapes give considerably more unit pressure than do small balls. However, the factors that determine the size and shape of burnishing material include: Openings in the work that may become plugged; inside corners which may not be reached by larger material, and the softness of the metal. Thus, a simple piece of work, such as the rectangular block used in the above example, could be burnished with ¼ or ⅜-in. balls. But, if holes were to be drilled in the piece, then burnishing material of such a size that would either not enter the hole or pass through freely would have to be used. Now, if ears or lugs were to be added to the block, it would be found that burnishing shapes such as "wheat," "diagonals," or "fin-balls" would have to be added to the balls to burnish the inside corners of the work. It is usually better to use small burnishing material for the soft metals, because of the lower unit pressure obtained.

When the work first enters the burnishing mass, the pressure is practically nil, but increases as the work is carried down through the mass. This type of fixture burnishing gives a more truly burnishing action than does free burnishing, insofar as the work is held down in the burnishing mass much longer and that the action of the mass upon the work consists of rubbing as well as pressure. With free burnishing, where the work is carried by the motion of the balls, there is little rubbing to attend the pressure.

Fig. 5 illustrates an Abott work

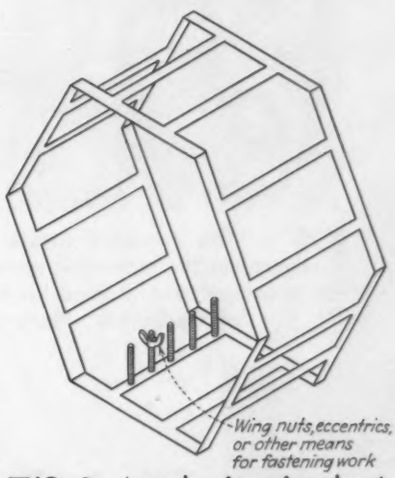


FIG. 3—A rack using winged nuts or eccentrics for holding work to be burnished firmly in place in the burnishing barrel.

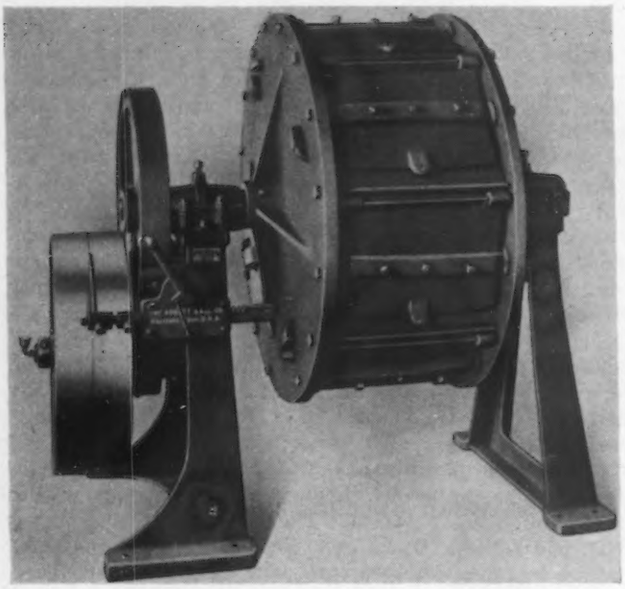
holding barrel. The sections can be removed one at a time enabling removal of the burnished work and replacement with unburnished work. Suitable jigs or fixtures are mounted on each section to hold the work. For example, hacksaw frames are easily finished in a barrel of this type. It is usually preferable to have two or three sets of fixture plates so that a loaded section may be inserted immediately after removing a burnished section.

Figs. 6 and 7 illustrate a Ransohoff fixture burnishing barrel with an ingenious means of separating the burnishing material from the work in the burnishing compartment. The barrel is divided, by means of a partition, into two compartments. The front compartment contains the work and the rear compartment contains the burnishing material when the racks of work are being changed. The two compartments are connected by means of a "ball return passage." The work is mounted on racks, as in Fig. 3, and inserted into the barrel through the large door in the front. The barrel is then rotated in the forward direction. The balls are automatically introduced into the burnishing compartment through ball return passage.

Water is taken into the barrel through a swivel coupling mounted in the hollow drive shaft. The barrel may be operated in a reverse direction so as to burnish both sides of racked work. A door in the ball return passage prevents the balls from leaving the burnishing compartment. After the work is burnished, the door in the ball return passage is opened, and the barrel is rotated in the "reverse" direction. The balls automatically return to the ball compartment in the rear so that balls will not be lost when the rack is removed from the barrel. This type of barrel can be used for burnishing aluminum cash register drawers, griddles, bowls, shovel blades and large globe valve bodies and other similar products. In fact, any work that can be easily nicked or that has sharp edged, thin walls, falls into this classification. The National Cash



FIG. 4—For holding hollow-ware in place, the work can be mounted inside a woven wire screen, locating it by small lugs, and holding it down with bars that are clamped so as to keep the work under a tension.



o o o

FIG. 5 — The sections of this Abbott work holding barrel can be removed singly, facilitating removal of finished pieces and replacement with unburnished work. Photo courtesy of the Abbott Ball Co.

o o o

Register Co. uses this method for finishing its cash register drawers.

In the case of unracked work, where the barrel is completely filled with work and the interstices are filled with balls, it is almost impossible to calculate the pressure or to determine accurately the exact action of the balls on the work. However, while a packed barrel probably only develops a few hundred lb. per sq. in. ball pressure, as compared to the thousands of lb. per sq. in. developed in the barrel that has a great mass of balls in it, there is enough pressure to do a fair job of burnishing.

Fig. 8 shows a barrel suitable for packed fixed burnishing. The empty barrel is filled full of fragile work and the balls are automatically discharged from the barrel and separated from the work. Work of a very fragile nature, such as small aluminum parts or thin-gaged steel punch press products, are especially well adapted to this type of finishing. If free burnished, the action of the balls on the work distort the work tremendously. When running a packed barrel, the balls always cascade down through the work and are kept in motion by the revolving barrel. There is no opportunity for the balls to form a mass great enough to distort the work.

The same general rules of burnishing compounds and lubricants apply to fixed burnishing as to free burnishing. It is usually best to use a reputable manufactured burnishing soap. In some localities, however, local conditions, such as

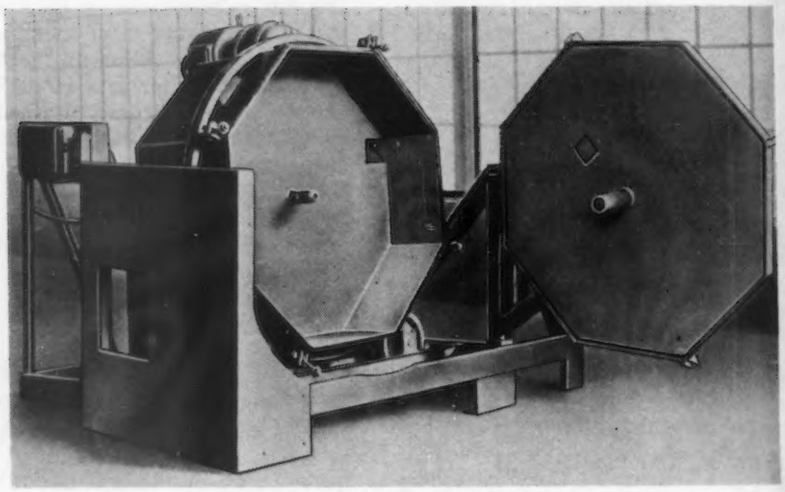
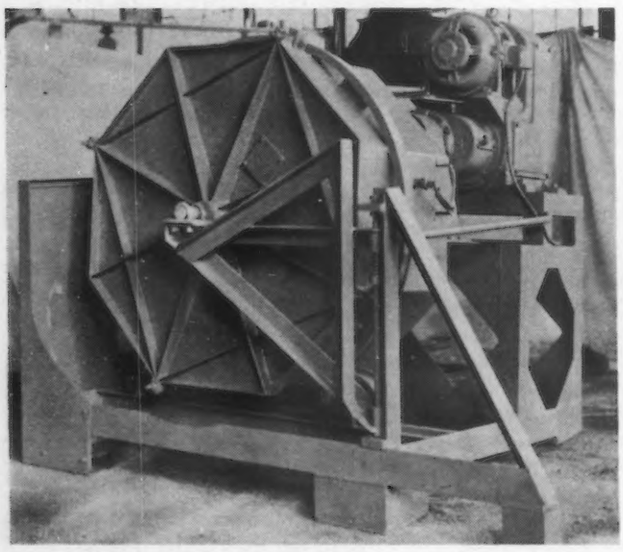


FIG. 6—This Ransohoff fixture burnishing barrel has a passageway for separating the burnishing material from the work, the material passing into a compartment behind the barrel through the hold in the inside face of the barrel. Photo courtesy of N. Ransohoff, Inc.



o o o

FIG. 7 — The Ransohoff burnishing barrel illustrated in Fig. 6 ready for operation. Water is taken into the barrel through a swivel coupling mounted in the hollow drive shaft. Photo courtesy of N. Ransohoff, Inc.

o o o

water, make is very difficult to use any one compound without making additions of other chemicals such as detergents and wetting agents. In case of aluminum, for example, barrel conditions must be very accurately controlled. There are well over 600 aluminum alloys and the same burnishing soap will not be suitable for all of them.

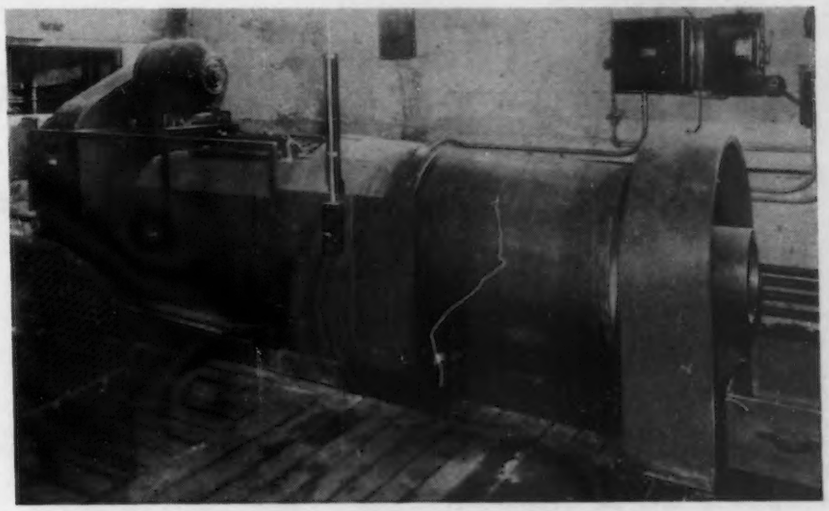
About a year ago, a method of burnishing aluminum which has worked out very well was developed. The pH or acid concentration of the burnishing solution is very important when burnishing aluminum, as aluminum oxide is very readily formed by basic solutions. The usual practice is to use a neutral

soap; one which hydrolyzes only slightly. While some aluminum oxide is formed, the layer is so thin as to be almost transparent. If local water conditions are basic, then there is trouble in trying to keep the burnishing solution from becoming too basic. The obvious answer is to use a weak acid of some sort. An acid, of course, cannot be used with soap as the acid will prevent the soap from hydrolyzing and forming suds. The proper lubricant to use would be one that is not a soap. Orvus W. A. Flakes answer this description very well. This material forms suds in acid, neutral or basic solution. A convenient acid to handle is oxalic acid, as it is a dry powder. Only enough acid is used to keep the burnishing solution at a pH of 7 or very slightly below. If too much acid is used, the steel burnishing material will quickly rust and a gummy formation of ferrous oxalate will be formed. This solution for burnishing aluminum is not recommended to replace the commercial soaps. It is only suggested for those cases where considerable trouble arises from the formation of black aluminum oxide. While this aluminum oxide can usually be removed by dipping in benzene and drying on a steam table, a benzene operation is rather hazardous. The oxalic acid-Orvus Flakes mixture will give excellent results with almost all aluminum alloys, producing a bright silvery finish that is free from all discoloration. This is especially important when burnishing large aluminum castings, such as grills for gas stoves, pancake griddles, pistons and hardware parts.

The problem of designing burnishing fixtures can usually be reduced to a few basic rules. The first and most important thing to be remembered is keeping the amount of material in the fixture down to a minimum. This will enable the burnishing material to have as much access to the work as possible. Of course, the rack or fixture must be strong enough to withstand the punishment that it will be subjected to in the barrel. Means must be provided for holding the work with safety, and yet enable the operator to replace it quickly and easily. The nature of the work itself dictates the use of wing nuts, levers and cams, rods and springs, or any of many other methods.

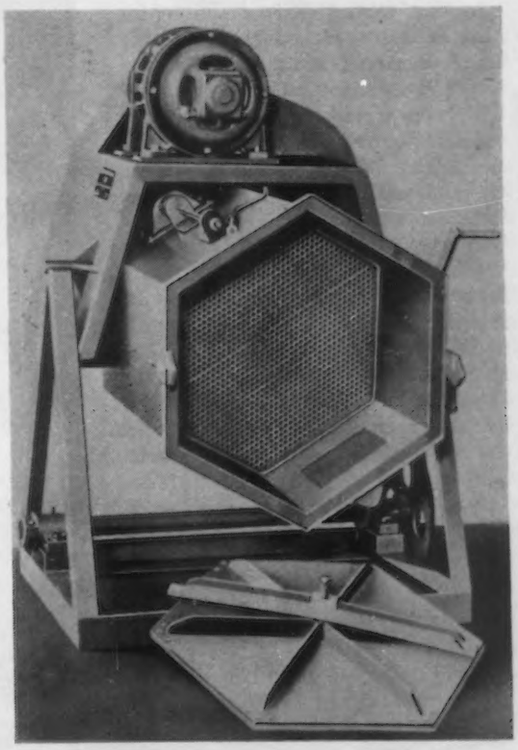
Fig. 4 shows one method of holding hollow-ware, such as bowls. The work is mounted inside a woven wire screen, with a mesh wide enough so that the balls can circulate freely. The work is kept located by small lugs, and is held down with bars that are clamped so as to keep a suitable tension on the work. Sometimes the fixture may be used for a plating rack. Thus, work may be racked, burnished, plated, and then burnished for finish with a minimum of handling.

The choice of the actual burnishing equipment is very wide. The small tilting burnishing barrel, manufactured by N. Ransohoff, Inc., Fig. 9, may be used for free burnishing or for fixed burnishing. In general, the barrels must have fairly large openings. The barrel shown in Fig. 5 has doors in the barrel periphery and these are readily removable. Figs. 6, 8 and 9 illustrate barrels which have the entire front removable. Many manufacturers present barrels split a little above center, so that a fixture may be lifted in or out.



ABOVE

FIG. 8—This burnishing barrel is suitable for burnishing fragile work by packing. The balls are automatically separated from the work when the work is removed. Photo courtesy of N. Ransohoff, Inc.



RIGHT

FIG. 9—This small tilting barrel is suitable for either free or fixed burnishing. Photo courtesy of N. Ransohoff, Inc.

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New Equipment . . .

Machine Tools • • •

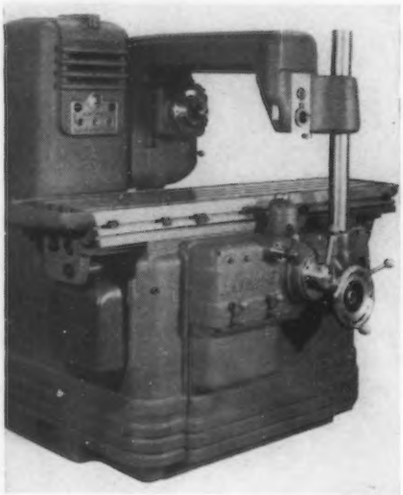
. . . The need for machine tools in national defense, and now in war production, has brought about ingenious developments in this field. Some of these improvements are discussed in the following.

Forge Turning Lathe

THE 60-in. heavy duty forge turning lathe, developed by the *Enterprise Co.*, Columbiana, Ohio, is especially adapted to the requirements of large forge shops for rough turning and finishing of heavy forgings. This lathe will swing 64 in. over the ways and 47 in. over the carriage, and the center line of the head and tail stocks is off-set to the rear of the center line of the bed, so that turning large diameter work, the tool post is directly over the bed rather than supported by the carriage cross slide projecting outside of the bed. The bed has heavy, double, vertical walls on both sides, boxed with cross girths on 40 in. centers. Two gear changes are provided in the head stock, driven by a variable speed motor of 50 to 60 hp., resulting in face plate speeds of from 2 to 72 r.p.m. Rapid power traverse is provided in both directions by a 3 hp. motor at the tail end of the bed, with the throw out clutch at the opposite end of the feed shaft.

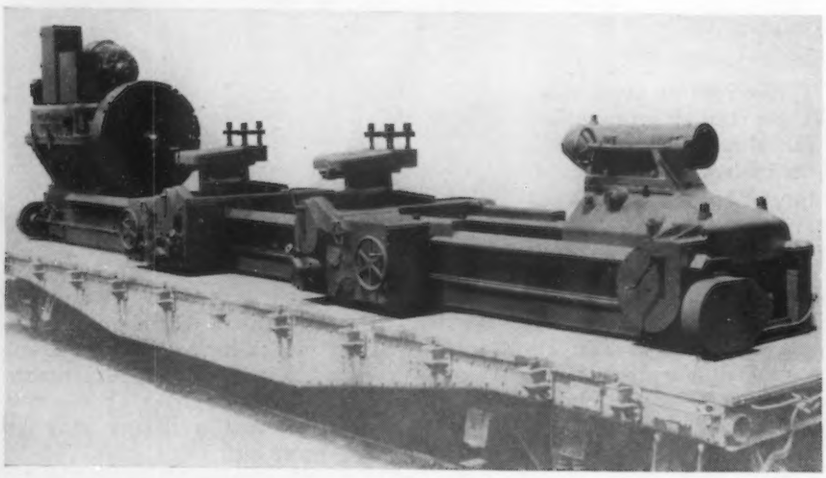
Down-Cut Miller

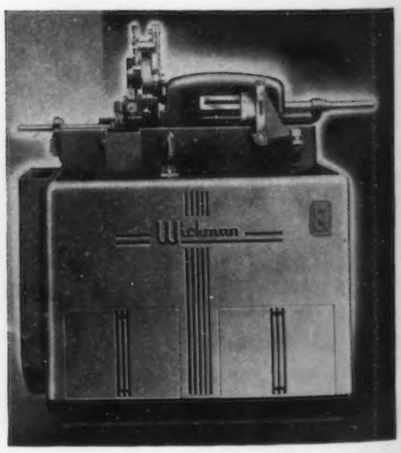
A NEW down-cut milling machine, adaptable to precision boring and tool building, has been announced by *Bremacc Corp.*, Detroit. The machine is built in three sizes, ranging from 1¼ to 16 in., 2 to 18 in., and 2 to 24 in. Spiral fluted cylindrical cutters, face and side cutters, and grooving and profile cutters can all be used on the machine.



Swiss Type Screw Machine

A NEW, Swiss type automatic turning machine has just been announced by the *Wickman Corp.*, Detroit, and is manufactured for this company by Sheffield Corp., Dayton, Ohio. The Wickman automatic is designed for use principally in the production of pinions, shafts, and long slender parts used in the manufacture of clocks, meters, and precision instruments for aircraft, radio, and ships. It is also extremely efficient in making striker pins, detonators, and pinions for fuses. The sliding headstock and tool head carry five tools that work radially. Single point turning tools are used and are provided with micrometer adjustment in both directions. Finish, accuracy, and concentricity of the work are maintained by a guide bushing in the tool head. The bushing can be locked, act as a slip





guide, or removed entirely permitting the spindle nose to travel up to the tools. Work is fed through the tools by the headstock, all movements of tools and headstock being controlled by cams. By a combination of headstock and tool movement, any angle or form can be produced without form tools, and there is no limit to the scope of the back shoulder work that can be done on this machine.

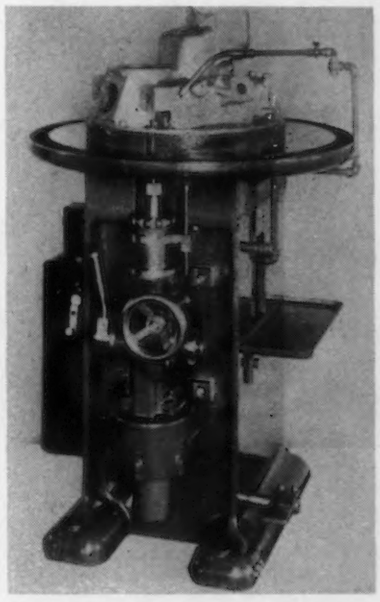
Miller

C. C. *BRADLEY & SONS, INC.*, Syracuse, N. Y., recently introduced their new Briggs milling machine, designed primarily for the manufacture of parts from hard steels where rapid, smooth, accurate milling is necessary. Unit Motor drive is provided with speed change levers giving eight arbor speeds from 46 to 176 r.p.m. An infinite number of table speeds up to 25 in. per min., are available, and rapid table return is provided. The table has a maximum travel of 20 in., with a maximum distance from the arbor center to the table top of 13 in., and a working surface of 30 x 8 in., with three standard 11/16 in. T slots. Arbors are available in diameters of 1, 1¼, 1½, and 1¾ in., and may be changed readily.



Back Spot Facer

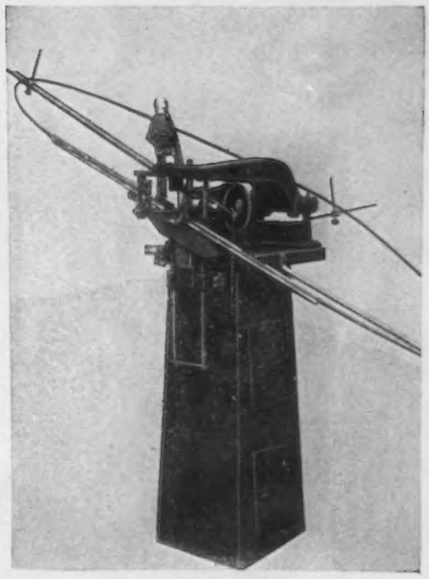
THE *Taft-Peirce Mfg. Co.*, Woonsocket, R. I., recently announced a new machine designed for counter-boring or facing bosses through which a hole has been drilled, but which, because of an obstruction, it is impossible to counterbore on a drill press. Near the front of the table on which the part is mounted is a hole to allow the shank of the inverted counterbore to project through the table. The cutter is driven by a spindle under the table, the spindle and driving mechanism being driven through bevel gears by a ½-hp. motor. The spindle feed is by hand,



either through a worm and worm wheel or direct by a rack and pinion.

Saw Filing Machine

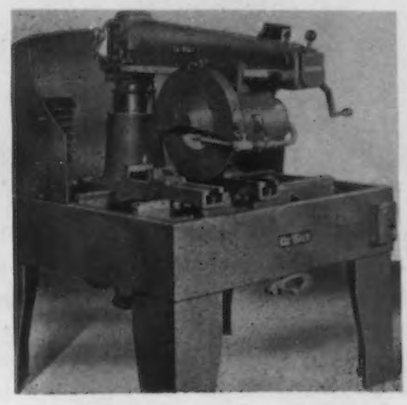
TO relieve operators of automatic saw filing machines of some of the troubles they have had in the past, the *Parten Machinery Co.*, Minneapolis, developed its new Quick Way universal machine. The number of moving parts in the machine have been reduced by more than 50 per cent, simplifying the machine construction and making it strong and sturdy. The purpose of the simplified design is to prolong the rigidity and accuracy of the new machine, eliminating vibration, chatter, and looseness. The filing arm weighs 45 lb., is mounted on two bearings that are 1¼ in. in diameter and are spread 11 in. apart to hold the arm rigid against



any possible side thrust or vibration. One of the principal improvements made is the use of a speed reducer motor, avoiding belt slippage.

Metal Cutting Machines

TWO metal cutting machines, a heavy duty and a high speed type, designed by *De Walt Products Corp.*, Lancaster, Pa., are particularly adapted for wet cutting ferrous and non-ferrous metals in both straight and angular cut-offs. Machines are designed for use with either abrasive wheels or metal saws. The heavy duty machine, illustrated, will handle metals 4 x 12 in. straight cut off and 4 x 8 in. on 45 deg. cuts, while the high speed saw is best adapted for 2 in. diameter solid and 4 in. section cut offs. Material is firmly clamped in the machine. An Acme threaded feed shaft runs through the slide block within the arm of the heavy duty machine, giving the operator a rigidly controlled feed.





Specialized machines—modern marvels of engineering — are a basic part of the carefully planned and coordinated production facilities, functioning a full 168 hours per week, which make it possible to manufacture Milwaukee Milling Machines in volume to the highest standards of machine-tool precision and quality.

This 15 ton, seven-spindle production unit was designed for machining T Slots in milling machine tables. It eliminates five independent cuts and increases production by more than 550% over ordinary methods. But what is most important — it insures a higher degree of accuracy than was previously obtainable.

Milwaukee MILLING



The full production capacity of our plants, the largest in the world devoted exclusively to the manufacture of milling machines . . . is dedicated to national security.

KEARNEY & TRECKER CORPORATION
MILWAUKEE, WISCONSIN, U. S. A.



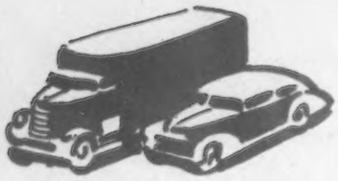
KEARNEY & TRECKER
CORPORATION
Milwaukee
MILLING MACHINES

One of a series of advertisements describing specialized machines — originated, designed and built by Kearney & Trecker Corp. to assure the quality of Milwaukee Milling Machines under mass production.

M A C H I N E S • • • • •

Assembly Line .

• Too many committees may hinder rather than help conversion of auto industry to war products . . . Cooperation already practiced among companies suggests how this industry may be brought into full production of arms.



DETROIT—The automotive industry needs a mirror into which it can look so it can size up all of its aspects and see its efforts in the war program in their true proportion. Such a mirror would greatly reduce the "primping" time that is being used up.

It might be helpful also if Labor and the public could take a look in the same mirror over the industry's shoulder.

The industry in this case isn't a single person. It consists of the three who make up the "Big Three," a goodly number of independents, the motor truck industry and a vast number of suppliers of parts, equipment and materials. Each of these units looks in the mirror like a healthy, steel-muscled, active and intelligent unit. And that is true. Among them they have turned out nearly $5,000,000,000 worth of automotive equipment in a single year—done so promptly and efficiently and at a profit.

But most of the industry is attempting to don a queer garment labeled "Committee for War Output." It is quite a job to get into this garment, although perhaps not much more difficult than it would be to get into the "Committee For War Output" garment which the UAW-CIO has attempted to button around the industry.

The mirror shows that one segment of the automotive industry is not interested in the "committee" garment. It is a group consisting of three truck makers who have discarded tricky garments, fancy labels, and committee agenda. These are not the normal habiliments of the automotive industry, so these truck makers simply rolled up their sleeves and went to work in the usual way.

THE story of initiative and hewing-to-the-line that is most refreshing in this war period is the one that can be told about The White Motor Co., Diamond T Motor Car Co. and Autocar Co. Their cooperative enterprise in the defense program offers a general pattern that cannot be overlooked by the rest of the automotive industry.

Eighteen months ago some of these truck makers were presented with an Army schedule for trucks and combat vehicles that looked—to them—probably as tremendous as the whole automotive war program looks to the industry itself today. At that time the Army wanted something like 9347 motor car units of a single standardized design, off the assembly lines of these three truck manufacturers. Taken together, the three orders totaled more than $70,000,000. The three companies grouped themselves together—not as a "committee to make 9347 trucks" but as a coordinated production unit. The working parts of this unit consisted of the heads of the purchasing department in each of the three companies, their three chief engineers and their respective production chiefs.

Most distinctly, these did not constitute a committee. They were men with authority in their respective fields to do all that was necessary to produce the trucks.

Without fanfare, the engineers from the three companies and from the Ordnance Department got together to clarify the design and make changes required by a new type of drive. They set up the design for a standard car, engineered so that all parts would be interchangeable. When completed, the design (which covered a "Half-Trac" scout car, a "Half-Trac" personnel carrier and a "Half-Trac" mortar carrier) was fundamentally the same as the one that White had been building for the government, differing mostly in the fact that a new type caterpillar tread was substituted for pneumatically-tired rear wheels.

When completed the design was released to the three purchasing departments in groups of blueprints.

THE purchasing departments, working together, drew up a letter of intent which was mailed to suppliers who already had quoted on necessary materials and parts. The joint letter of intent bore the signatures of the three purchasing men and covered total requirements of each firm, price, terms, cost of tools, and each company's pro rata share of the tool cost.

Each company then sent its own purchase order to each supplier to give him final authority and keep his records straight, although the letter of intent had already enabled him to proceed without waiting for three separate purchase orders to arrive. A final step of the buyers was the issuance of letters of joint ownership of tools and dies, authorizing each vendor to use such tools and dies to build future orders for production or replacement parts which may be placed by any of the three companies, without specific authorization from the other two.

Over the telephone, or across a desk, the production men had decided what each could do to fill the orders. It was "Joe, do this," or "Jim, build these for us."

The result of this experiment in cooperative management (by three firms who have been keen competitors) is that today they are between four and five months ahead on their war orders and that they are progressively undertaking bigger and more important jobs without a hitch.

This experiment has not been on such a small scale that it is valueless. A $70,000,000 order, plus others which followed, don't constitute "small potatoes."

The job that has been done already, is on a large enough scale to point a way for the automobile industry to handle its wartime production.

There is no need for any more

"committee" than is already represented when the chiefs of the Big Three get together around a table. They are constituted so they can make decisions, whereas a committee would not be.

IT is spelling out the plan, and perhaps making it sound too simple, to point out that Chrysler has already done enough tank manufacturing so that its Eddie Hunt and his crew at the Tank Arsenal might very well be delegated by the Big Three to run the whole tank job in the industry. Or that O. E. Hunt of General Motors and his staff might continue their splendid ordnance job, but undertake the responsibility for the whole industry, not just for GM. Or that C. E. Sorenson and the men who are building and tooling the Willow Run Bomber Plant so expeditiously might undertake the responsibilities of all of the bomber work that the individual companies and corporations have undertaken.

This would be a real "management pool," not one diluted with demi-gods like Reuther, and not just another committee, either.

Corporate lines would be cut across by such a procedure, startlingly so. Feelings would be hurt; there are plenty of men in the industry just as capable as these are in the job of making tanks and planes and guns and shell. But feelings are going to be hurt, even more, if the UAW committee dictates the procedure.

Of course, the pay roll situation is complicated. Maybe each one of the Big Three would have to underwrite one-third of the salary for the tank boss, the airplane boss, and the ordnance boss, but bookkeeping difficulties would not concern these men if they had a chance to do a real production job for the nation.

Granted that the set-up herein described is over-simplified—yet it parallels almost exactly what White, Diamond T and Autocar have already done.

Most important, it avoids the chance that one more committee—a bigger one than the last one—will bog down on its job.

Frankly, it is an observer's opinion that the industry must already have had enough experience with committees. There are those ap-



WHEN foremen see Thomastrip moving from stockrooms to machines, they know the quality of this steel is a duplication of the previous load. They know speedy production will continue without delay for adjustments.

Thomas maintains this high degree of cold strip uniformity through wide experience, plus a system of laboratory approval, scrupulous manufacturing care, and special inspection methods during each step of mill production.

THE THOMAS STEEL CO., WARREN, O.

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

pointed in Washington, OPM, OEM, OPA, OPACS, SPAB, as examples. Also, there is the Automotive Committee for Air Defense—appointed after the October 25, 1940, meeting of the industry to help initiate a bomber program for the Big Three. This committee did a marvelous job—as a committee. But when it came to the point of signing contracts, tooling and buying materials and parts from suppliers and sub contractors, erecting buildings, installing assembly lines, or actually building bombers—that was another story. Then a committee set-up was not enough.

Then the task had to be turned over to people who were constituted with enough authority and responsibility to carry it out.

* * *

Note: Mr. Sherman, the writer of this critical study of automotive management technique in the handling of the war program, acknowledges in advance of possible retorts, that he is the first outsider—since Walter Reuther—to attempt vicariously to tell the automobile industry how it should tend its own business.

Republic Orders Coke Ovens

Cleveland

• • • **Republic Steel Corp.** announced it had let its first contracts in connection with its $58,000,000 war expansion program, and these were for the construction of 300 by-product coke oven plants in Cleveland, Warren, and Gadsden, Ala. The Defense Plant Corp. is financing the ovens at Cleveland which will be build by Koppers Co. of Pittsburgh. At Republic's Warren plant the Semet-Solvay Co. will construct 75 coke ovens. This same company will build a similar number at Gadsden. The Warren coke ovens will operate in connection with the new Republic furnace at Youngstown.

SWOC Asking "Little Steel" for Wage Rise

Pittsburgh

• • • **The Steel Workers'** Organizing Committee was to have asked for higher wages when it met with "Little Steel" this week to resume contract negotiations which were temporarily halted last December. The SWOC met with Bethlehem Steel Tuesday of this week and was to have held meetings with Republic Steel, Youngstown Sheet & Tube, and Inland Steel Co. Wednesday or Thursday.

While the exact amount of the demand has not been disclosed, it is believed that another 10c. an hour raise will be sought, but there is no indication whether this new bargaining point will be successful. The discussions on union shop and dues checkoff will also be resumed, and some labor authorities believe that these questions may finally be placed at the door of the new War Labor Board. While it appeared a few months ago that the fight for a closed shop and checkoff would reach strike proportions, it is now thought that because of the war, it will be arbitrated without work stoppage.

Management Not Labor's Job, Says A. F. of L. Official

• • • **The American** Federation of Labor concedes to management the right to manage industry, to plan production and allocate tools, in the opinion of Earl Melton, general vice-president of the International Association of Machinists, who voiced his position in a letter to William S. Knudsen on Jan. 8.

"It is not our position that labor should assume any responsibility in connection with the ordinary functions of management in handling their production and engineering problems," said Mr. Melton, a representative of AFL on the automotive advisory committee to OPM. He pointed out that with the UAW-CIO having a majority membership on the committee, "the views presented in the name of organized labor were those of the CIO Auto Workers Union."

Foundries Seeking Heavy February Iron Allocations

Cleveland

• • • **Merchant pig iron** producers report that the tonnage being asked by consumers for February approximately equals that for January. Although it is likely that many consumers did not make allowance for the fewer working days in February in estimating their requirements, the net result will be stiffer treatment of low-rated orders.

Consumers filling out the PD-69's are said to be filling in the wrong month in 30 per cent of the forms being submited, i.e., asking for a February allocation on a form designated "January" by the consumer. Other more serious errors continue to crop up, and in one rather surprising case a leading foundry producing machine tool castings had actually been estimating its monthly requirements incorrectly for some four months.

Grand Rapids Concern Will Make Wing Assemblies

Grand Rapids, Mich.

• • • **American Seating Co.** has received a contract from the Beech Aircraft Corp., Wichita, Kan., to make wing assemblies for the new two-motor Army Bomber trainer designed by Beech, according to Harry M. Taliaferro, president of American Seating Co. The contract will require expenditure of more than 1,000,000 man-hours of work by plywood craftsmen and would include the making of tools, jigs and fixtures for the plane assembly and parts of the fuselage. Production is expected to be started within two months.

AIR RAID PRACTICE: To emphasize to its 2000 employees the seriousness of war and to launch a company Red Cross and Defense Bond Campaign, Ohio Crankshaft Co., Cleveland, staged an outdoor air-raid practice in sub-zero weather. A thermite bomb demonstration was held, and the employees visited one of the American Rolling Mill Co.'s air raid shelters, borrowed for the occasion.





WHEN a tool is being repaired or replaced . . . it is on the "sick list" and production capacity is wasted. Costs go *up* and machine-hour output goes *down*. "Sick" tools interrupt the steady flow of work from your machines and presses.

That means tools must be made to work more *consecutive* hours before they need attention. And the best way to make sure of *continuous* production from each tool is to simplify the proper *selection* of tool steel—and closely follow recommended *heat treatment* methods.

This prescription, developed by Carpenter for better tool performance, is helping industry to meet the tremendous demands of defense for faster and faster production. Carpenter *Matched Tool Steels* are helping industry to make tools that boost production because they work more hours without interruptions for "doctoring". As a direct result of Carpenter's program of providing information on the proper *selection* and *heat treatment* of tool steels, the production capacity of tools has risen between 20% and 100% in many plants.

To help customers get the most out of every pound of tool steel they use, we have prepared this 158-page Carpenter MATCHED TOOL STEEL MANUAL. It contains the useful *Tool Index and Steel Selector* that shows how to make tools work more hours on every job. This handy MANUAL also contains heat treating and drawing instructions, to make the proper *selection* of tool steel most effective. Your Carpenter representative will be glad to give you a copy of the MATCHED TOOL STEEL MANUAL.



THE CARPENTER STEEL COMPANY • READING, PA.



● The Carpenter MATCHED TOOL STEEL MANUAL, showing sample pages from the *Tool Index and Steel Selector.*

Carpenter
MATCHED
TOOL STEELS

Washington . . .

• History repeats itself in America's pre-war fumbling . . . Now Donald Nelson takes over same gigantic task that Baruch overcame in the First World War . . . Top-heavy, non-essential bureaucracy one of big obstacles new production chief faces.



WASHINGTON — Experience in the early days of American participation in the first World War was one of fumbling and confusion in getting American industry shifted to a military footing. The same has been true with respect to the present war.

After the War Industries Board was set up in 1918 with Bernard M. Baruch as its head, mobilization moved swiftly and most effectively. Its record was outstanding. Repeated efforts were made to have the present Administration start its mobilization program with a similar single-headed, powerful control but the effort was unavailing.

Instead the past blunders, conflicts of authority and absence of clear-cut direction were intensified. Organizaitons have been heaped one upon another and agencies, often working at cross purposes, have been created. Personnel has been and is being so vastly expanded that scores of old and new buildings have the atmosphere of a bedlam. Yet still more "temporary" buildings are to be constructed to accomodate hordes who are being added to the payroll. Without knowing how they can be housed, estimates are made that 40,000 to 125,000 more "defense workers" are coming to Washington to clutter up further an already sprawling, top heavy bureaucracy that has mushroomed into existence in the guise of a defense organization. Old and some comparatively new Government agencies are being "decentralized" by removal to other towns amidst vigorous grumblings of the affected personnel. This is being done to make room for oncoming "defense workers."

YET the eternal cry is for more and still more space. No thought is given to abolishing scores of boondoggling, tax-eating outfits that are only political in character. Loose talk of economies and curtailment of non-essential expenditures still is fed out to mollify growing complaints of extravagances but little in the way of actual slashes in such expenditures is expected. Heretofore it seems to have been easy to justify the outlays as part of the defense program but reports coming to Washington reflect a rising skepticism that these expenditures are necessary. On the contrary they are looked upon as retarding the defense job and as being partially responsible for the bogging down of the defense work.

Because of this and without knowing what he can or will do about paring non-essential costs and simplifying the defense machine, Donald M. Nelson's selection by the President as Chairman of the New War Production Board has met with a definitely favorable response. Assuming he is permitted to use the power that he is said to have, much faster and much more efficient war output may be looked for. Though belated, the recognition of the necessity of a single head over production has had a wholesome effect.

MR. NELSON is a man of high character and ability. Allowed to exercise broad authority he should be able to perform the mighty task of arming the nation and aiding its allies so as to insure the earliest possible victory. One of his first jobs certainly would seem to be to bring the defense administration out of its confusion and complexities and to simplify its operation instead of making it more burdensome and conflicting as it was becoming under SPAB and OPM. This simplification is partially accomplished automatically since SPAB is eliminated and the two-headed OPM, which made it headless, comes under one-man control.

Mr. Nelson, who has been executive director of SPAB and OPM Director of Priorities, has shown himself to be a man of vision who sees that past efforts to create a war machine will be dwarfed by the gigantic effort that lies ahead. Of equal importance he has shown himself to be a man of courage, and it is going to take a lot of that to enforce procurement and production that unfortunately is going to hurt civilian business tremendously and press hard against civilian requirements.

QUITE conceivably it may be that Mr. Nelson will, for example, have to tell the steel industry, the machine tool industry and a multiplicity of other industries, that they can give no more than a trickle, if that much, of their output to civilian consumers. It may be that he will have to draw a sharp line of distinction between what is and what is not non-essential. While priority control will be delegated to others, quite conceivably there will have to be a reshuffling of this difficult problem and a rearrangement of schedules to be finally determined by him. Mr. Nelson has said that he is prepared to shake up the nation's entire defense organization if that is necessary "to lick Hitler and the Japs."

Mr. Nelson stands well with industry but in fixing and enforcing policies he might well find himself at odds with different industrial groups. There is no doubt that he will perform his duty with determination in the face of differences. He may be expected to be "tough," not in the petty way of exhibiting authority, but after reasoned decision based upon the realistic purpose of getting out the tools of war with the greatest possible speed and volume.

His attitude toward labor is expected to be similar to that which he takes toward industry since in deal-

ARE YOU UP IN THE AIR

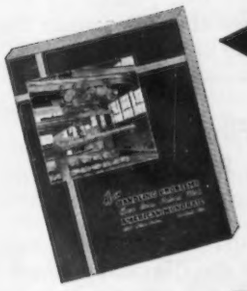
IN HANDLING PROBLEMS?

HUNDREDS of manufacturing concerns, large and small, have solved their handling problems with American MonoRail Equipment. And in many plants this low cost, flexible handling system has soon repaid itself.

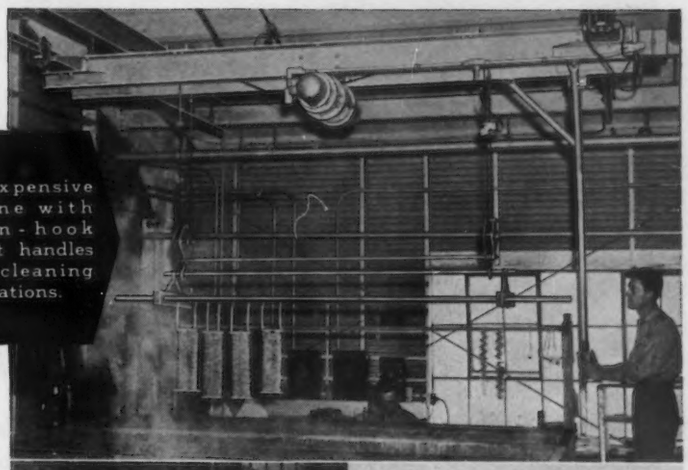
How? By eliminating your floor congestion, by combining lift, carry and storing operations, by increasing your return from skilled labor and by carrying your product at the lowest possible cost.

Regardless of the type of business, there is a system suited to your problem. Standard parts are assembled into complete systems to meet the special requirements of the particular jobs.

If you are "up in the air" about materials handling, let an American MonoRail Engineer show you how to handle material "in the air". Definite recommendations will be made and a detailed plan submitted without cost or obligation.



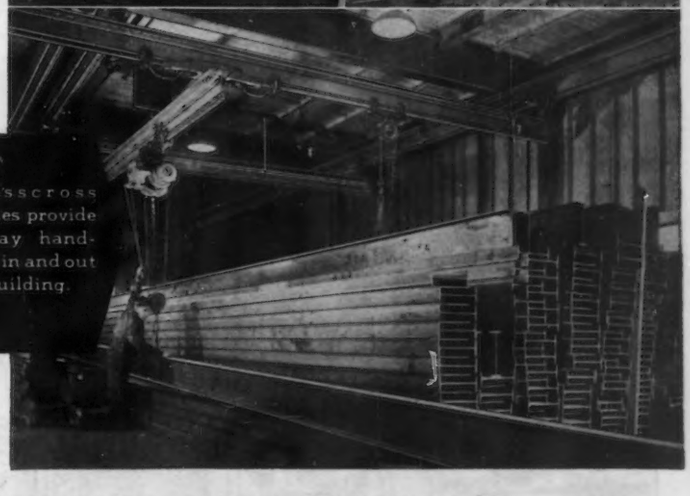
Write for copy of "Blue Book" showing hundreds of illustrations.



Inexpensive crane with twin-hook hoist handles all cleaning operations.



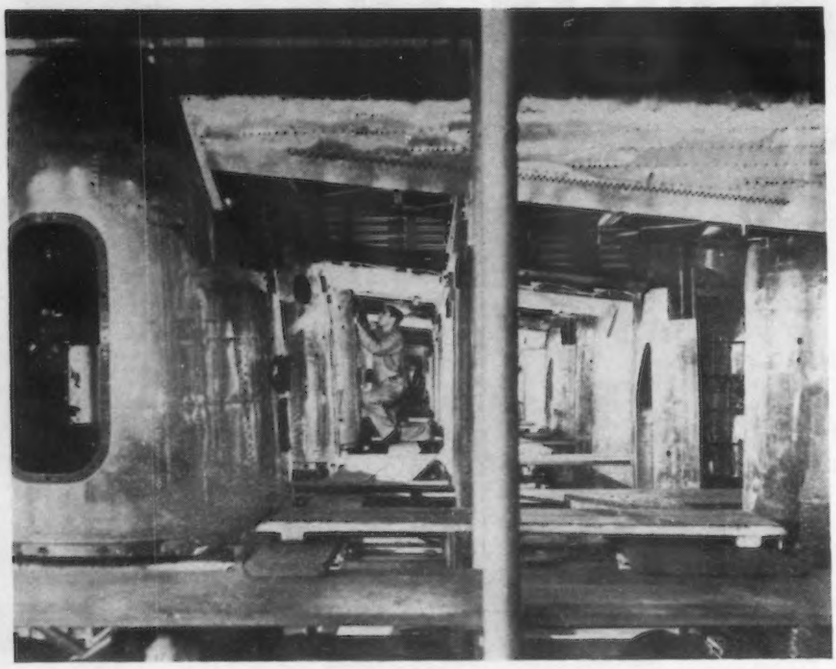
Special retractible crane over driveway saves $600 each year.



Crisscross cranes provide 2-way handling in and out of building.

THE AMERICAN MONORAIL CO.

13103 ATHENS AVENUE — CLEVELAND, OHIO



British Combine Photo

BOMBERS IN THE MAKING: This is one of the wing jig production lines at the Boeing Aircraft Co., Seattle, where the famed Flying Fortress is being built. Here, in huge steel tube three-story jigs, entire inboard wing panels are fabricated. The wings are built in vertical jigs, with engine nacelles pointing down.

THE BULL OF THE WOODS — BY J. R. WILLIAMS



ing with both he has a common objective which is war production. Mr. Nelson has had no wide experience in labor relations but has a social philosophy altogether favorable toward good wages, reasonable hours of work, and high standards of living.

So far as is known, organized labor is either faborably inclined or has a sort of suspended judgment toward Mr. Nelson.

In urging greater and faster production Mr. Nelson might well run into conflict with labor as to hours and policies of employment but here also he is expected to be "tough" if necessary, yet only for realistic and emergency purposes based upon reasoned judgment.

The "toughness," exercised in the sense indicated, will have to be displayed for Mr. Nelson has been given one of the toughest jobs ever laid on the shoulders of man.

Sheet Metal Firm Doubles Output for War in 10 Days

Washington

• • • **Ten days after** the United States declared war, a manufacturer of sheet metal was able to double to two carloads daily its production of accessories for artillery shells, according to an announcement made by the Army Ordnance Department. The company, a subsidiary of a large steel company, in normal times manufactures sheet steel for such products as 5-gal. oil cans and fancy sheet metal ceilings.

"Such a rapid increase in production is a very rare occurrence in industry," said the statement, pointing out that company officials and the officers of the district ordnance office had made plans months before the emergency for increasing the company's output."

Cleveland Firms Add 6 Million in Floor Space

Cleveland

• • • **An industrial expansion** survey taken by the Cleveland Chamber of Commerce reveals that in 1941, 441 concerns here added 6,659,000 sq. ft. of plant space, involving a total expenditure of $128,459,424. Most of the firms involved are on defense work.

South America Gets 375,000 Tons of Steel

Washington

• • • **OPM has allocated** 375,000 tons of steel to South America for the first quarter of 1941, D. McKeachie, chief of OPM's Division of Purchases, has announced. Other metal allocations included 2500 lb. of tungsten and 15,000 lb. nickel. These allocations, it was asserted, have been approved by the Board of Economic Warfare, South American representatives and the Foreign Requirements Section of OPM.

In announcing the allocations, OPM said that these materials would not come out of our military supplies, but did not elaborate upon this point. Observers pointed out that previously both OPM and the Truman Committee have asserted that severe shortages exist in these materials.

Mr. McKeachie said that further steel allocations would depend upon prompt receipt of "use" classifications and specifications, as the report on steel was not quite clear regarding these points.

Allocations made represent 42 of the 110 that have been projected and they place the South Americas on precisely the same footing as the United States, so far as limitation of supply is concerned. This, Mr. McKeachie said was in accord with the announced policy of the President and the State Department.

Plan Talks by U. S. Officials For Iron & Steel Convention

• • • **"New Steel Requirements** for Merchant Ship Construction," "Priorities and Allocations," and "War Demands on the Steel Industry," are the subjects of talks to be given by Government officials at the conference of the Iron, Steel and Allied Industries to be held Feb. 12 and 13 in Del Monte, Cal. In addition, C. B. Tibbetts, vice-president, Los Angeles Steel Casting Co., will speak on "The Steel Industry's Part in This Emergency," and H. S. Simpson, president, National Engineering Co., Chicago, and American Foundrymen's Association, will talk on "Castings in Industry." Another speaker, not yet announced, will speak on "Industry's Position in Emergency Readjustments."



War machines and munitions have to be good to stand up under war conditions. They must be made rapidly in huge quantities by a variety of plants. All parts must be strictly interchangeable.

Hence the task of guarding quality becomes a matter of life and death importance to a nation rearming to preserve its liberty.

Sheffield Visual Gages are stalwart guardians of dimensional quality. They are used in checking dimensions of manufactured and purchased parts, tools, production and master gages.

The sturdy Reed Mechanism, combined with the light beam lever arm, provides a sensitivity to meet the highest precision standards of measurement—but without the delicate fragility so often associated with sensitivity.

These gages are not delicate, they are strong and deadly accurate. They are made in various models to check accurately to thousandths, "tenths" or millionths of an inch and all provide rapid, easy gaging to any limits required on production work.

Write for information.

THE SHEFFIELD CORPORATION
Gage Division · DAYTON, OHIO, U.S.A.

SHEFFIELD MASTER GAGEMAKERS

WEST COAST . . .

• Stabilizing of designs, breakdown of job by individual plants, completion of present building program are seen as necessary steps to realization of President's 185,000-plane program . . . New union agreement may put shipyards on 7-day week.



SAN FRANCISCO — Congressional criticism of the aircraft industry for failure to produce more planes is reminiscent of the small boy who jams a slug in the penny gum machine, then goes into a tantrum when it fails to deliver.

The billions which have been appropriated for aircraft are just slugs to the industry's integrated industrial mechanism. No alchemist have developed a formula to directly reduce dollars into planes. The pig iron of the aircraft industry is blueprints and orders, a stage which can't be by-passed.

The experience of the past two years must be utilized and further incentive provided if we are to produce 185,000 military planes in the next two years. Some problems will be sniping at us from the past unless they are liquidated immediately. We must:

1. Set our goal. It is not enough to reduce 185,000 planes to general classifications, nor even to models. Individual builders must be notified what is expected of them with sufficient exactness to enable them to plan plant, equipment, personnel, and material requirements and make advance arrangements with suppliers. Up until now, most of the industry's growth has been like a banyan tree—branches first, roots afterward.

2. Settle our designs. True enough, battle sometimes vetoes theory. Faults are sufficiently cumulative, however, to enable the military to flash a yellow light to manufacturers before switching on the red. Split-second stop-work orders militate against efficient utilization of facilities.

3. Finish our present program. Setting a new goal does not justify junking our present program and slowing down while we decide what to do next. Dovetail present production into the new plan. No need to make a dead stop. Make appropriations available well in advance of expected production. jamming on the brakes not only stops the plane factories but halts operations of suppliers and subcontractors.

4. Integrate production schedules of suppliers with plane assembly schedules. Too many planes have stood complete for weeks, lacking only minor parts. Fault has been in dumping orders for miscellaneous military needs on suppliers from all directions rather than in misscheduling of procurement. Aircraft manufacturers are only the front men for thousands of smaller industries; otherwise, such phenomenal growth would have been impossible. Planning must go behind the lines.

5. Remember not to stand behind the plumber and tell him how to work. As production expands, more and more Johnny-come-latelys, both among management and labor, will be making aircraft. New production men will recognize limitations imposed by specialty materials, methods, requirements. Unless we watch out, amateurs in labor and public life will cause serious delay by trying to plan management's routine.

DONALD W. DOUGLAS' comment on the 185,000 plane goal was, "Given the necessary materials and tools, given the opportunity to complete existing schedules and to accelerate production without needless interference, American industry can and will rise to the emergency and astound the world." Those words must have been weighed on an apothecary's scale.

Fault that has been found with production methods of the industry could better have been assessed against its financial structure. Controlling stock in far too many aircraft companies is registered in the names of financial "wizards" who speculated luckily in depression years. Production failures have been traceable more to apathy or avarice by financial lords than to misplanning by production men. As more seasoned industries turn their efforts toward aircraft manufacture, firms built solely of financial paper will be forced by competition to strengthen their structure.

A practical agreement by which Pacific Coast shipyards may work around the clock seven days a week was concluded last week at San Francisco at a meeting attended by representatives of the OPM, Navy, Maritime Commission, shipyard operators, and AFL Metals Trade Unions which hold a closed shop contract in Coast yards. The agreement will go into operation when formally ratified by the Navy, and membership of the 200 unions involved. Representatives of AFL Machinists' Union No. 68, San Francisco, and CIO Machinists' Union, Oakland, which staged a three month's strike last year seeking double time for overtime, were not invited to attend the meeting. If all goes well, ratification by the participating unions should be concluded by January 26 and the plan in operation in 19 Coast shipyards.

Under the terms of the master agreement whch has been in force up until the present time, 40 hrs. has constituted the basic work week, 8 hrs. per day, five days per week, Monday to Friday. Overtime was paid at the rate of time and one-half on Saturday and double time on Sundays and holidays. These rates were established on the basis of six-day per week operation.

The new agreement, now that yards are to be operating seven days a week, contemplates a six day, 48 hour week for individual workers. For the sixth day, they will be paid time and one-half, and the seventh day, if it is worked, will bring double time pay. The important basic recognition of the agreement is that the particular day of the week on which a worker toils is not important. Emphasis

[CONTINUED ON PAGE 96]

Consistent with the Demand of Modern Machine Tools . . . this Clutch has

4 Extra Advantages

● Several years ago, in cooperation with a few prominent machine tool builders, the Twin Disc Clutch Company designed and built this single hub, duplex MT Clutch. It has been standard equipment on some prominent machine tools for the past two years.

Now that exhaustive tests have been completed . . . the correctness of the design fully established . . . and the necessary changes in production made—these clutches are available to all manufacturers of machine tools in these sizes: 3″, 3½″, 4″, 4½″, 5″, 5½″, 6″, 7″, and 8″.

Advantages of the Twin Disc Single Hub, MT Clutch

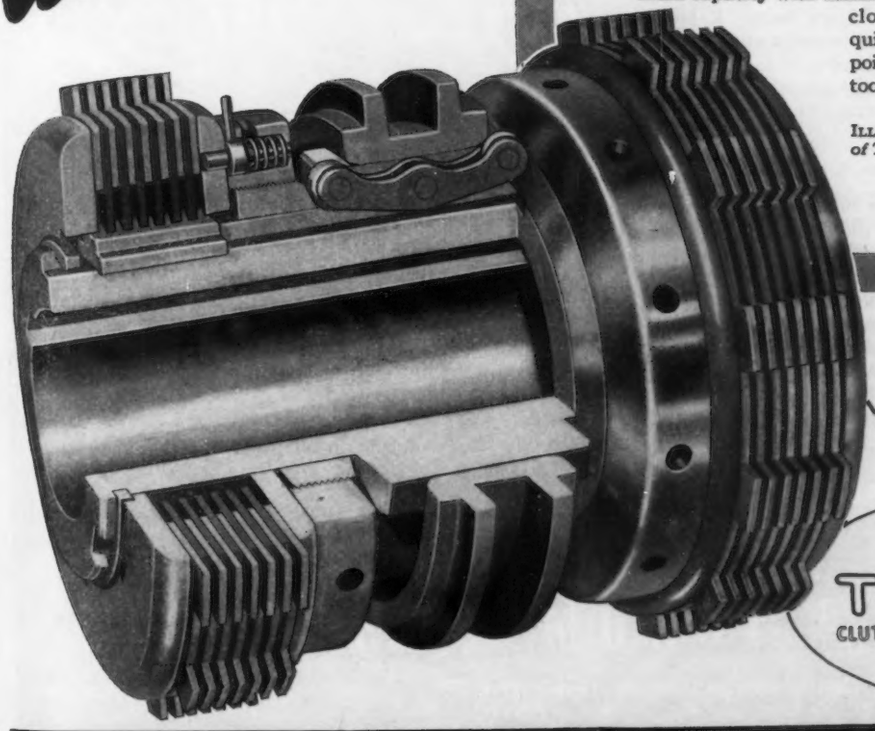
1. The pivoted, single, operating lever assures positive disengagement of the opposite clutch when either clutch is engaged. Likewise, the positive disengagement of both clutches when in neutral position.

2. In the single hub design there are fewer pins, therefore, less points subject to wear.

3. The use of widespread keys permit a wider base, prevent any tendency of the key to tip. This results in a stronger key, a more simple hub design.

4. Shorter over-all length.

Like all Twin Disc Machine Tool Clutches, the single hub clutch has phosphor bronze driving plates driving high carbon, heat-treated and ground steel driven plates to assure excellent wear, a smooth engagement without clutch chatter. The grooves cut in the driven plates, shear the oil out quickly. This action provides maximum capacity with minimum pressure. Adjustments as close as .003″ are easily and quickly made by hand at a single point, without the use of special tools.



ILLUSTRATED: *Cross-sectional view of Twin Disc single hub MT Clutch.*

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U. S. PAT. OFF.

TWIN DISC CLUTCH COMPANY, 1370 RACINE STREET, RACINE, WISCONSIN

Fatigue Cracks BY A. H. DIX . . .

Johnny Get Your Gun

• • • We are alarmed to observe among our brain workers a growing desire to do something that will enable them to give a satisfying answer when their descendants ask, "Grandpa, what did you do in the Great War?" The urge to be directly identified now with the Government, either in a combat capacity or otherwise, is both understandable and commendable, and yet may be diametrically opposed to the country's best interests.

To say that the war will be won, or lost, by industry, is trite. Yet it needs repeating over and over again. Many can best serve by doing the best possible job right where they are. Each member of this journal who fears a future grandchild's accusing eye can obtain photostats of a great and growing stack of letters from arsenals, navy yards, and munitions plants, proving that by supplying information on the speeding of production the members of the brains department are now in the service as surely as if they were answering a 5:30 reveille or inhabiting a Washington warren. And to far better purpose.

A general stampede from industry and farm into direct Government service would be a certain way to lose the war. A bit of poetry in a recent Bethlehem Steel ad expresses it nicely:

> "Enough, if something from our hands have power,
> To live, and act, and serve the future hour."

Stopper

• • • Don't fail me now baby . . .—*Wallace Barnes Co.*

Two Minds With . . .

> Quite a coincidence. Just came across, in your Jan. 8 issue, your Stopper reading "Keep 'em Flowing," as used by Logan Conveyors.
>
> I didn't see this when it appeared, but my copy for Pioneer Engineering & Mfg. Co. in the January publications also has this same line. Great minds, these advertising men have.
>
> —*C. J. Shower, Charles M. Gray Associates, Detroit*

Logan Conveyers used the headline in the Jan. 1 issue, so it is a simple case of simultaneous invention. Other variants on "Keep 'em Flying" are "Keep 'em Filing" and "Keep 'em Fleeing," the last a suggestion of Winchell's for use by the U.S.S.R.

"Keep 'em Flying" always makes us think of one of Kellett Autogiro Corporation's executives—B. M. Smiling.

Shell and Cartridge Book

• • • Lately everybody seems to be writing in for clippings of articles we have published on how to make shell and cartridges. We have run completely out of copies, so decided to reprint them all in one book. The book, numbering 110 pages, should be off the press by about Monday.

If you want just one copy will you please send a dollar bill, stamps, or check, so we won't have to put through a charge. The title of the book is "Shell and Cartridge Manufacture." Our address is 100 E. 42nd St., New York.

Remington Ruby

• • • A bow in the direction of News Editor Jim Rowan for this verbal gem that sparkled in a recent *This Industrial Week*—"an off-key note."

Writer's Cramp Induces

> Speaking of long names, what's the matter with the Ideal Hollow Metal & Kalamein Store Fronts, Inc., Brooklyn, N. Y.?
>
> —*Van*

O. K., but Wright's Automatic Tobacco Packing Machine Co. still leads by an apostrophe.

No Pot Shot

• • • We hope you realize that our staff members are literally taking their lives in their hands in collecting the treasure this argosy carries to you each week. Much of it is obtained by plant calls, and most metal-working plants are patrolled these days by guards whose zeal is frightening.

The staff reports are reading more and more like guerilla war communiques. We quote the following report of a call on a certain tool manufacturing plant, not because it is exceptional, but because of its *Northwest Passage* style:

> This place is really guarded! Wire fence gate and factory door are locked. Outside, paces an armed guard, rifle in sling over his back. The guard's fur cap and service clothes resemble Daniel Boone's. Has a hungry look in his eye of a hunter who has gone all day without seeing a pheasant. Even the big Annual didn't allay his suspicion, and my calling card didn't seem to interest him, but the inside guard peeked out; I knew him, and he vouched for me.
>
> When I came out I told "Daniel Boone" that I hoped his gun was loaded and that all of us are through being polite and gentle—time to get tough. He liked that; showed me some of his rifle bullets, 351 Remingtons, soft nose—they splatter you all over the map. Says he's already shot at two people and hit one.

Paper Hoarders

• • • Nothing is deader than yesterday's newspaper. By the same token the life of a weekly publication should be a week, but frequently we receive evidence that copies of your favorite family journal keep on rattling through the corridors of time like a cough in a cathedral. A crane manufacturer tells us he just received an inquiry from interior China referring to an ad he ran in *The Iron Age* back in 1936.

But the troglodytic broad jump prize goes to Dalhousie University, Halifax, Nova Scotia, which just sent us a letter addressed to *"The Iron Age, Middletown, N. Y."* John Williams founded *The Iron Age* there in 1855. About 1860 he moved to New York City, so the issue Dalhousie consulted for the address must have been more than 80 years old.

Boom, Boom

> Your mention of the Butt Welding Co. and Wm. Bros. Boiler Co. reminds me of the Boom Boiler Co. of Cleveland. Actually they capitalize on the pun in their name by showing, in their advertising a cannon with a burst of flame and smoke issuing from its muzzle, with the word "Boom" written across it.
>
> —*R. A. Schakel, Diamond Chain & Mfg. Co.*

Wise-Cracking Sentry

• • • The one that John (Automobile Mfrs. Assn.) Gibbons sent in about cooties being mechanized lice has a sequel in a story about Private R. H. Horse of Fort Rosecrans, Calif.

One night he was challenged by a sentry, who asked, "Halt! Who is there?" "Private Horse." "Advance, Private Horse, and be mechanized."

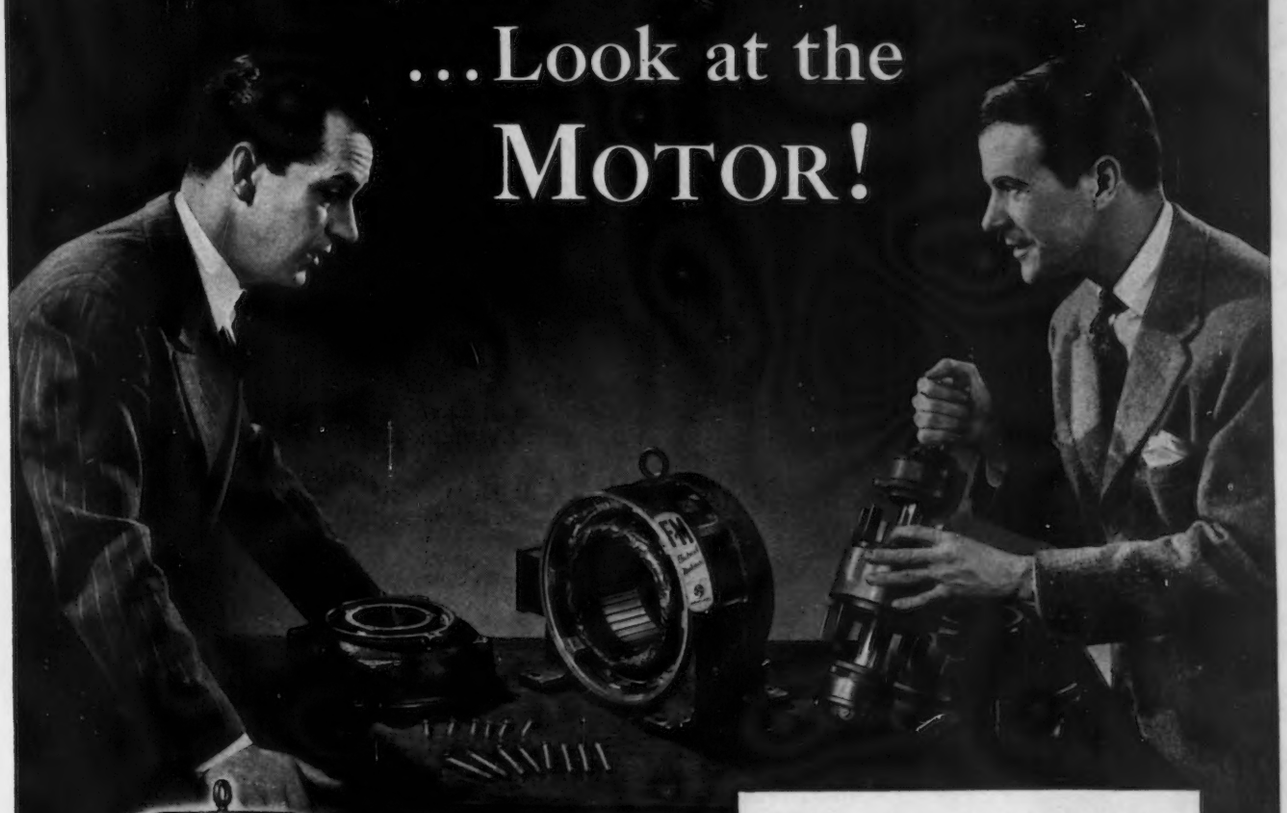
Puzzles

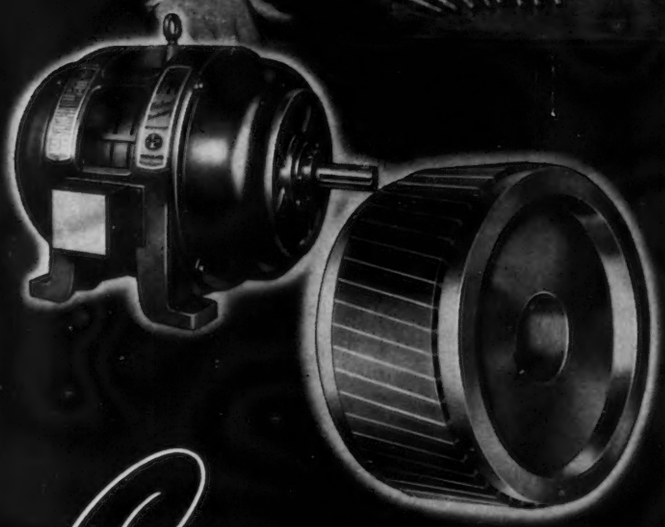
• • • All of last week's Christians can be saved by lining up in this order (C for Christian, H for heathen): CCCCHHHHHCCHCCCHCHHCCHHHCHHCCH.

If you can answer this correctly in six minutes advance to the front row:

> From a pint bottle of wine a glass of wine is poured. The glass is then poured into a jug containing a pint of water. The glass is filled with the mixture and poured into the bottle of wine. Has more wine been taken from the bottle than water has been taken from the jug, or vice versa?

Look Beyond the TRADE-MARK ...Look at the MOTOR!





Copperspun
Patented

YES, we are proud of the F-M trade-mark. But we are far more proud of the kind of motor on which that trade-mark appears. We know, and you know, that it's the motor and not the trade-mark that runs machinery.

That's why we ask you, when buying, to look beyond the trade-mark—*look at the motor.*

Look at the construction of a Fairbanks-Morse Motor point by point. Compare the Copperspun Rotor with any other type of rotor. Then ask yourself whether you want windings centrifugally cast of *COPPER* or of some less suitable material.

We believe that you know motor quality when you see it. That's why we ask you to look at the MOTOR. A post card or telephone call will bring you a demonstration. Fairbanks, Morse & Co., Dept. A38, 600 S. Michigan Ave., Chicago. Branches and service stations throughout United States and Canada.

FAIRBANKS·MORSE F-M MOTORS

DIESEL ENGINES ELECTRICAL MACHINERY MAGNETOS RAILROAD EQUIPMENT WASHERS-IRONERS
STOKERS PUMPS MOTORS WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

Dear Editor:

"E" FOR ANNUAL

Dear Sir:

The Annual Review issue is colossal. It was dropped on my desk with a thud that woke the entire drafting room, thus rendering, without even having been opened, an extraordinarily valuable service to the war effort. A Navy "E" should be assigned.

W. TOERGE

A.O.G. Corp.
Providence, R. I.

HYDROGEN EMBRITTLEMENT

Dear Sir:

The writer is interested in obtaining the article "Hydrogen Embrittlement" published in THE IRON AGE of Nov. 27.

D. G. WELLS

Savage Arms Corp.
Utica, N. Y.

Dear Sir:

Will you please furnish us two copies each of "Hydrogen Embrittlement," and "Surface Structures and Chemistry of Heat Treated 18-4-1 Steel," as published in THE IRON AGE.

A. S. JAMESON

International Harvester Co.
Chicago

Dear Sir:

Can you forward me two copies of "Hydrogen Embrittlement," published in your Nov. 27th issue?

P. ELLEMAN

Evinrude Motors
Milwaukee

● Reprints of the article "Hydrogen Embrittlement," by H. J. Noble, Jacobs Aircraft Engine Co., are available from the Reader Service Department, THE IRON AGE, 100 East 42nd Street, New York.—Ed.

Mg REQUIRES "KNOW HOW"

Sir:

The article "Magnesium Sand Castings" by N. M. Briskin, published in the issue of July 10, contains a number of statements which we consider to be unsound. . . . The impression given by the writer is somewhat misleading, in that he makes the production of magnesium castings appear to be extremely difficult and largely a matter of luck.

There is, of course, a great deal of "know how" in the production of satisfactory magnesium alloy castings, but a suitable technique can readily be established by experienced founders, and when this has been done good quality castings can be regularly produced.

There are two outstanding points on which we wish to comment:

The first is the statement, page 51, referring to "the susceptibility of these alloys to fatigue failure." Service experience in Europe and test figures in Europe contradict this statement. Magnesium alloys give Wöhler fatigue figures which are quite comparable with those of aluminium alloys (vide A.S.M. Handbook, 1939, "The Technology of Magnesium and Its Alloys," etc.).

The second point is that mentioned on page 52, to the effect that "complete solution of aluminium and zinc would require about 50 hr., but nearly all the improvements sought by heat treatment can be obtained in 18 to 24 hr." It is probably true to say that a long time is required to produce a perfectly *homogeneous* solid solution, but it is incorrect to say that times longer than 24 hr. are required to produce *solution* of the aluminium and zinc normally present in commercial magnesium alloys.

The author's discussion on the metallography of solution treatment leaves the reader with the impression that the heat treatment which can be applied to these alloys is a kind of improvization and that proper solution treatment cannot be applied. It can readily be shown by metallographic examination that full solution of the aluminium and zinc compounds can be achieved in times considerably shorter than 24 hr., and reliable and consistent results can easily be obtained in quite commercial times.

A. B. LISLE

F. A. Hughes & Co., Ltd.
London, England

TIGHT SCRAP

Sir:

. . . I have an idea. Scrap iron is tight. Governmental units, from Washington down to the small villages, have old machines, old scrap steel and iron that under ordinary commercial procedures is very slow in coming on the market. Has the government set up an organization for scrap procurement, or would one be in order?

W. C. BAKER

Baker Machine Shop
Altus, Okla.

● (1) No; (2) Yes.—Ed.

WHEN IS AN ALLOY?

Dear Sir:

I have been trying to determine the difference between carbon or alloy steels and tool steels. There apparently is some remote division in these materials which is very hard to obtain. Sections 2 and 10 of the A.I.S.I.'s bulletins distinctly point out the difference between carbon and alloy steels but they have published nothing indicating the distinction between tool steels, die steels, and the carbon and alloy steels mentioned above. I would appreciate it if you would advise me how this difference can be determined.

W. J. MAYERS

A. M. Byers Co.
Pittsburgh

● This distinction between alloy and tool steels is based on use, melting practice and quality control. In other words an alloy steel used as a tool (for cutting or piercing, for example) is called a tool steel; when it is used for die work it is called a die steel. However, when the alloy steel is used as a structural member, say in an automobile, it is simply designated as an alloy steel.—Ed.

PRIORITIES GUIDE

Sir:

We received one set of the Priorities Guide. It was our understanding that this schedule was to be revised at regular intervals. Are you going to have them reissued?

F. B. HERSCHBERGER

Sheffield Steel Corp.
Kansas City, Mo.

● A revised edition of the Guide will be in next week's issue.—Ed.

CLECOING

Dear Sir:

I have just been reading the article "Briggs Aids Aircraft Production" and find a word used which I am unable to locate in the dictionary. The article refers to "parts to be clecoed together." Can you describe the clecoing process for me?

DAN PATCH

Boston, Mass.

● Clecoing is a method of temporarily clamping aluminum sheets together prior to riveting. Cleco sheet holders are widely used in the aircraft industry and are made by Cleveland Pneumatic Tool Co., East 78th Street, Cleveland.—Ed.

PAGING PROF. WULFF

Sir:

I note in THE IRON AGE a report on papers presented at the second powder metallurgy conference at M.I.T. I was especially interested in a reference to a paper by H. H. Hausner and P. W. Blackburn on "Compound Contact Materials." I would appreciate it if you would tell me how I could obtain a copy of this paper and the discussion.

H. E. COBB

Furnas Electric Co.
Batavia, Ill.

● Prof. John Wulff, Massachusetts Institute of Technology, Cambridge, Mass. will probably be able to supply you with a copy.—ED.

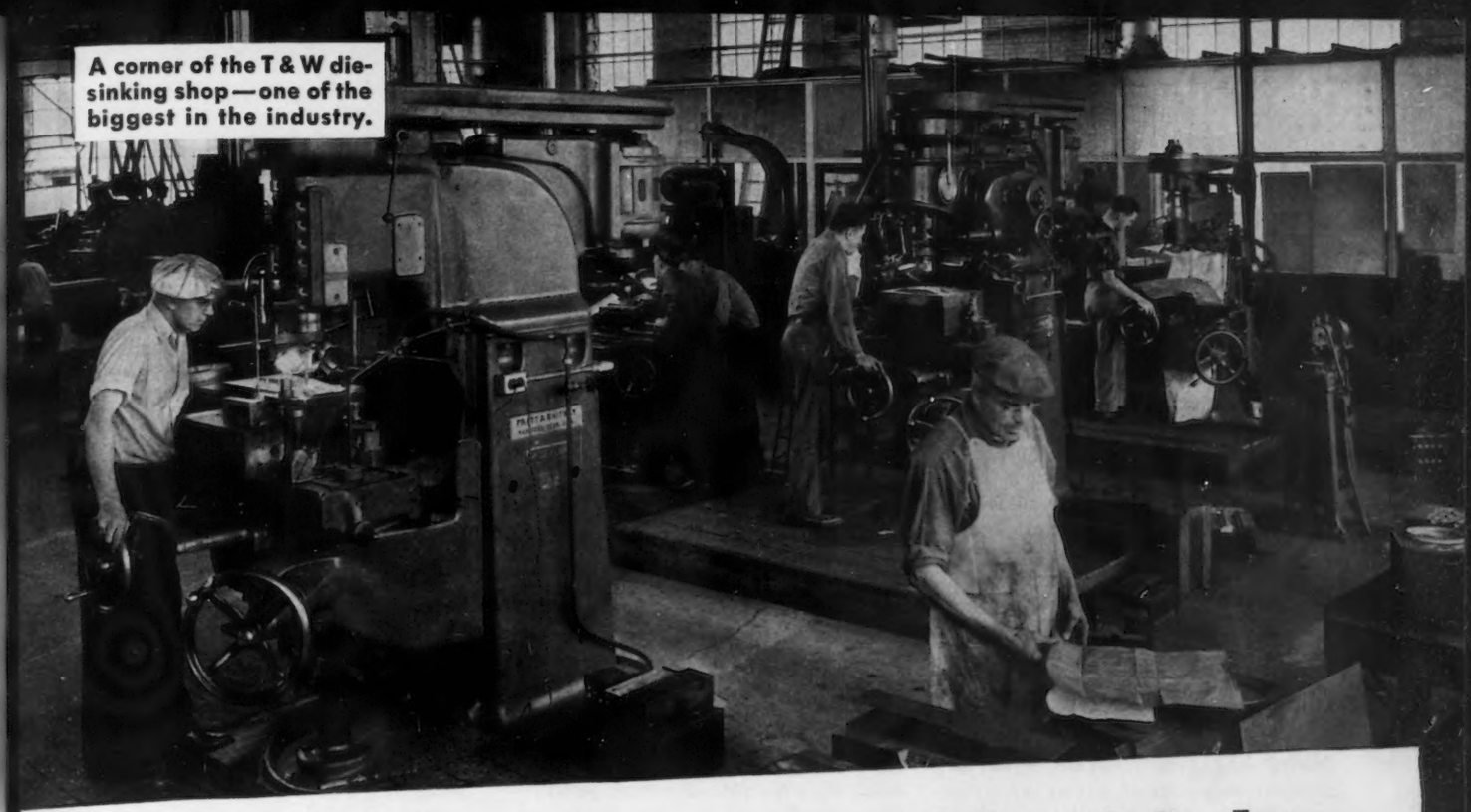
WHEN THEY SAY NO

Sir:

Mr. Van Deventer's recent editorial "When They Say No" is very timely and exceedingly well written in a friendly phraseology. While we read the article in Iron Age, having been subscribers for so many years back we can't remember, still another copy from Geo. D. Roper Corp. came to our desk this morning. It looks as though you supplied it. If so, can you send us 100?

Haverstick & Co.
Rochester, N. Y.

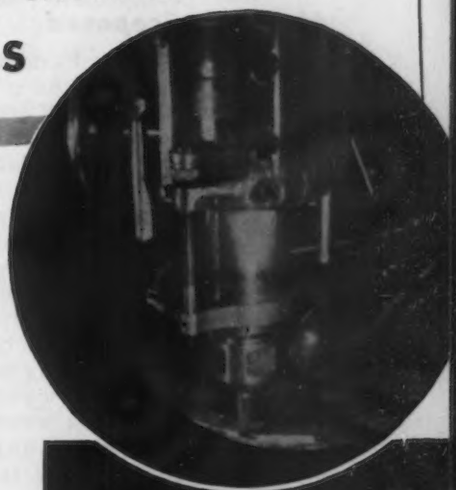
● "When They Say No" was a bell-ringer. Requests for more than 100,000 reprints swamped us. Your 100 is on its way.—ED.



A corner of the T & W die-sinking shop—one of the biggest in the industry.

Faster Forging and Machining

DEPEND ON HOW DIE-DESIGNERS MAKE THE DIES THAT FORM THE FORGINGS





★ Skilled die-designers are the arch foes of limitations. In 60 minutes a skilled die-designer may accomplish work that will save hundreds of hours in forging and machining a quantity of forgings. Dies can be sure-fire cost-reducing tools. And, dies can be the means of saving pound upon pound of metal.

An urgent necessity in waging war is the gaining of time. Time gained in the production of such vital things as forgings for aircraft may win an earlier victory. Excess metal on forgings is of itself a costly waste, often an unnecessary waste. Machining it off adds to the cost of forgings, retards production and assembly, and postpones the day of victory. Forgings formed from T & W dies are usually formed to close tolerances. Because, T & W forgings are free of excess metal they require less time to machine and finish, and thus they have the effect of increasing the capacity of both machines and skilled men. T & W die-craftsmen are responsible for the fact that T & W forgings usually cost less at the point of assembly.

In the T & W die-sinking department dies are made for forgings weighing from one ounce up to 800 pounds by some of the most skillful die-sinkers in the forging industry. T & W forgings formed in T & W dies pass the most rigid and exacting inspections because they are of unusually sound physical structure and possess "quality advantages" beyond what the specifications call for.

T & W FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY

TRANSUE & WILLIAMS STEEL FORGING CORPORATION

ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

This Industrial Week . . .

. . .

AMONG the questions up for settlement in the weeks to come is "How tough is Nelson?" Will the new war production board, under the single leadership of the Chicago mail order house executive who has shown unusual capacity as well as endurance in his many months at Washington, equal or surpass the record of the Baruch board of the first World War?

For more than a year, U. S. industry has been a team with no government signal caller able to run the plays with full authority. Now Nelson is the quarterback, hence the complaint that nobody is running the arms program from Washington can no longer be made. And Mr. Nelson is reported to be tough and smart.

Power to Seize Machines Proposed

Meanwhile the most drastic step yet taken to enforce the priority system of distribution of war materials and equipment is proposed in the second war powers bill now being considered by the Senate Judiciary Committee. This bill contains provisions for giving the armed forces all-out power to requisition any machine deemed necessary for war work, regardless of how much that machine is being used. Requisitioning powers under the selective service act are restricted to machines which are not in actual use and which are not considered necessary for the operation of a plant.

Ignorance One Cause of Priority Violations

Included in the war powers bill are provisions for a fine of $10,000 and imprisonment for one year as the maximum penalty for proved priority violators. Discussions of the bill have brought allegations that OPM investigations have shown widespread violation of priority regulations. (The "S" or suspension orders of the OPM Priorities Division can be used to shut off priority assistance to priority violators. See THE IRON AGE "Allocations and Priorities Guide" for details.)

Undoubtedly some of the violations of priority regulations are caused by ignorance of how this complicated system works but violators of all classifications are likely to be driven into line.

Demands Made for Steel Wage Rise

In weeks to come, the question "How tough is Nelson?" is bound to occur to labor union leaders, as well as to leaders of other groups. While control of labor rests with the new war labor board, not with Mr. Nelson, the war production results which the American public will demand, depend on continued labor peace. However, meetings now being held by representatives of the SWOC, including Philip Murray, president of the CIO, and representatives of several steel companies, again present the danger of that familiar threat to the arms program in this war, the dispute over the closed shop.

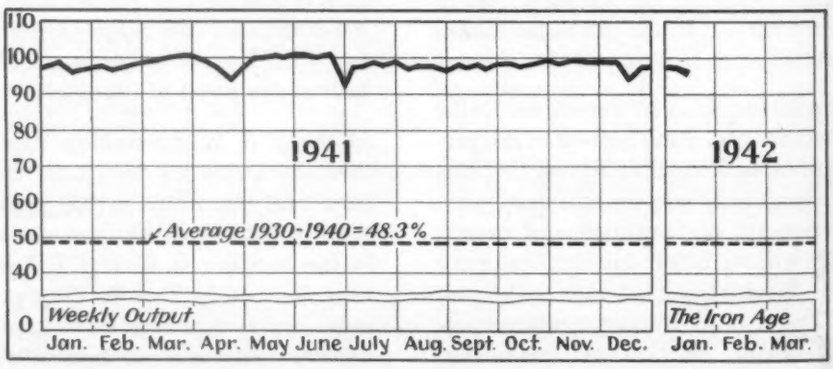
Mr. Murray, strengthened by the argument of rising living costs, is asking the steel industry for a "substantial" wage increase, a demand which is accompanied by a request for the closed shop, under which all employees must belong to the union to hold their jobs, and for the check-off of union dues, a plan of forced contributions by union members to the unions. Michigan SWOC leaders have asked a $7 a day minimum for steel workers. Already predictions are being made that the "closed-shop-in-steel" will be one of the first big cases to go before the war labor board.

To produce steel in the quantities demanded by the victory program, steel plants must have not only peaceful labor relations but sufficient scrap. Of all the nations at war, Japan has been considered most vulnerable from the viewpoint of supplies of raw materials like scrap. It is likely, however, that Japan's supply of scrap is far more ample than is generally realized and is sufficient to permit high armament production by that country for many months to come.

Japan's iron and steel scrap pile at the start of 1942 is estimated at approximately 10,000,000 tons. In the decade just ended Japan received about 11,600,000 tons of scrap from the United States, a period in which the Japanese steel industry produced approximately 56,000,000 tons of steel ingots and castings, and about 30,000,000 tons of pig iron. Factors taken into account in a survey in the current issue of THE IRON AGE include Japan's imports of finished steel

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts-burgh	Chi-cago	Youngs-town	Phila-delphia	Cleve-land	Buf-falo	Wheel-ing	De-troit	South-ern	S.Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week.....	97.0	102.0	95.0	91.0	97.0	90.0	88.0	94.0	95.5	102.0	97.0	85.0	103.0	96.5
Previous Week....	97.0	101.0	95.0	91.5	96.0	90.0	88.0	94.0	95.5	93.0	97.0	92.0	104.0	96.0

products, as well as scrap, its home produced scrap and recovery of old metal from large-scale wrecking operations in China.

Mills Experiment With Light Scrap

Because of prospects that steel production may be lower in 1942 than last year, due to the scrap shortage, U. S. steel mills are beginning to experiment with light grades of scrap. Scrap collectors in the East have been burning the tin off old cans in bonfires and sending the charred cans to the steel mills. One mill in the Pittsburgh-Wheeling-Weirton scrap district is experimenting with use of partly detinned cans in steel melting. In an effort to salvage the tin from old cans, two large detinning firms met recently with OPM representatives at Washington.

The recent announcement that a drive is being conducted to end misgrading of iron and steel scrap, under a system in which OPA inspectors will appear at consumer plants without advance notice, is not unwelcome to many steel plants and foundries. Scrap found to be upgraded will be recommended for reclassification and sellers and consumers will be liable to penalties.

OPM to Classify 100 Basic Materials

This week the Office of Production Management, which is likely to be abolished in Nelson's streamlining of the war production machine, is working on a method to determine the demand for any one of 100 basic materials according to the end use, and to what degree, considering the stress of war consumption of material, this use should be supplied. This method is called the end use code, and it is said the 100 broad bands of use may be considered as "supply bins" from which materials may be directed both for civilian and military needs.

Each use and material are to be assigned a code number, or subcode number according to breakdowns under each number. All OPM reporting forms will be accompanied by a copy of the code as a guide to manufacturers who will indicate from the guide the end use of the various materials.

Perhaps no price or priority order issued by the government has caused greater dissatisfaction than Price Schedule No. 49, covering the resale of iron and steel products. Ever since it was announced in December, the order has been the subject of disputes. Exporters at New York, fearing bankruptcy, complained immediately, and were followed by many other steel sellers. Thousands of sales outlets are affected by Price Schedule No. 49. Latest to appeal for relief is the American Steel Warehouse Association which, in presenting a long list of hardships imposed, asserts that "the inequities of the order, now becoming increasingly apparent, are such, and their results so disastrous, that they cannot be permitted, in fairness, to continue."

Much Criticism Aroused

The assumption that major steel warehouses maintain complete lines of steel stocks has caused much of the criticism of the price order. However some warehouses in a given area may not have the material requested, with the result that the customer shops around and finds it at some distant point. Because the order is defense business, the warehouse at the distant point is obliged to fill it, at a price reduction of as much as $3 a ton. Some authorities believe dislocated tonnages of this type should be sold F. O. B. shipping point plus freight without the $3 absorption given as the example. The Warehouse Association declares that the order not only attempts to fix a price ceiling, but introduces widespread changes and confusion in the economics of steel distribution, bars warehouses from the carload market, and restricts warehouses to certain trading areas and, it concludes, interferes with the war effort.

Steel production this week is at 96.5 per cent of capacity, a half point advance over last week, according to THE IRON AGE estimates. This minor rise is due to small gains recorded at Chicago, Cleveland and in Southern Ohio. The Pittsburgh rate is unchanged at 97 per cent, and Youngstown output is holding for another week at 95 per cent. St. Louis dropped seven points to 85 per cent, the Eastern Area one point to 103 per cent and Philadelphia area a half point to 91 per cent. While operations in Southern Ohio rose nine points to 102 per cent, Buffalo is unchanged at 90 per cent, Wheeling at 88 per cent, Birmingham at 95.5 per cent and Detroit at 94 per cent.

Steel Bookings as Heavy as December's

Steel orders booked so far in January are equaling, or in a few cases exceeding, the volume of the corresponding period in December, although orders had been expected to decline somewhat because of the all-out war program. The OPM has allocated 375,000 tons of steel to South American countries for the first quarter of 1942, together with some tungsten and nickel.

Approximately 1,750,000 tons of steel will be needed for the 522 merchant ships for which contracts totaling $948,000,000 were announced last week by the U. S. Maritime Commission. The ships, made as part of the victory program, call for 8,000,000 tons of ships in 1942 and 10,000,000 tons in 1943.

Orders for tubing to be used in manufacture of bombs are expected to be forthcoming within the next few weeks. The initial orders are expected to be for seamless tubing, but lap weld and eventually electric welded tubing may be used, a development which will handicap other tubing users such as the oil industry.

Machine tool shipments during 1941 totaled $775,130,000, according to the National Machine Tool Builders Association, compared with the 1940 total of $450,000,000. Shipments in December, 1941, amounted to $85,100,000, as compared with $52,000,000 shipped in the last month of 1940.

Structural steel awards total 29,000 tons compared with 48,000 tons last week, and new structural steel projects call for 24,500 tons against 10,000 tons a week ago. Reinforcing steel awards total 28,000 tons against 55,000 tons last week. New reinforcing steel projects total 33,100 tons.



What SCREW MACHINE PRODUCTS MANUFACTURERS *say about . . .*

HARDINGE SECOND OPERATION MACHINES

These comments about the Hardinge Second Operation Machine are from Screw Machine Products Manufacturers — organizations whose business is to produce accurate parts in quantity — *economically*.

- Falls Machine Screw Co.: **Your machines have truly proved themselves to be a good investment. With them our set-up men report that they cut in one-half the time ordinarily required to put on 90% of the jobs.**
- Pacific Screw Products Corp.: **They have been instrumental in saving several grinding operations because of the extreme accuracy of the collet system employed.**
- Canadian Acme Screw & Gear, Ltd.: **We have been using forty-five Hardinge Second Operation Machines on munition work for approximately two years, twenty-four hours per day, and have found them very satisfactory for this type of work. They are fast, accurate and dependable. The headstock is particularly well made and has never caused one minute's lost time.**
- William Steinen Mfg. Co.: **Your machine is beyond expectations. One can never appreciate a machine like it until he actually works one himself . . . your machine is really remarkable.**
- Louis T. Weiss: **Your machine is most satisfactory . . . attachments used also convert it to a high speed precision lathe . . . finishes parts to within .0002".**
- The Napoleon Products Co.: **At all times, the machine does exactly what is expected of it on very close tolerance work.**
- Olson Brothers Co.: **We are using three Hardinge Second Operation Machines and are well pleased with the accurate work produced on them.**

HARDINGE BROTHERS, Inc., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

News of Industry

° ° °



Wide World Photo

RECLAIMING TIN: A process for the reclamation of tin from tin cans and other coated material has been developed by Dr. W. C. Gregory and E. Baden-Powell, copper consultant and geologist-engineer respectively of the California Detinning Corp., Los Angeles. The company plans to salvage 40,000 tons of tin cans annually. The cans are shredded by hammers and run over a magnetic belt. The tin-rich material is then reduced under pressure and electrolytically deposited on iron rolls. After removal from the rolls it is remelted and cast into pigs.

Japs' Scrap Pile Considered Ample For Months To Come

New York

• • • **The scrap pile** of the Japanese steel industry at the start of 1942 may have been as high as 10,000,000 tons, far greater than many persons realize and sufficient to enable high armament production by the Japs for many months to come, according to estimates by authoritative sources here.

No one knows the exact extent of the stockpile in the land of the Rising Sun, but by applying mathematical percentages, which over the years have been found reliable by steel mill operating executives, reserves can be estimated fairly closely.

In fact, two different methods of calculation bring quite similar results.

In the decade just ended Japan received about 11,600,000 net tons of iron and steel scrap from the United States, having suddenly become an importer of large tonnages during the depression which hit this country.

In the same ten years, the Japanese steel industry produced close to 56,000,000 net tons of steel ingots and castings, and about 30,000,000 net tons of pig iron.

Assuming that 90 per cent of the Japanese pig iron production went into steel making, the production of approximately 56,000,000 tons of steel required the use of 32,000,000 tons of scrap in the past ten years. This estimate of scrap consumption allows for the normal 10 per cent loss of metal in the steelmaking process.

From steelmaking operations during the manufacture of finished steel from ingots, the Japs in the past ten years should have obtained approximately 16,000,000 tons of scrap suitable for remelting. In addition, the Japanese had access to supplies of scrap accumulated by steel-consuming industries in the manufacture of fabricated steel products.

Applying the tonnage of purchased scrap consumed (using the American basis of purchased scrap equaling 40 per cent of total scrap consumption) it appears that about 13,000,000 tons of scrap might have been recovered by the Japanese steel industry as purchased scrap from Japanese steel-consuming industries.

Using still another basis, the tonnage of purchased scrap applied to shipments of finished steel products to steel consuming industries (which in the American steel industry averages 30 per cent of the shipments of finished steel products) indicates that somewhat over 12,000,000 tons of scrap could have been purchased by the Japanese steel industry in the past ten years.

These two methods of estimating yield quite similar results. The average of the two methods indicates a figure of about 12,500,000 net tons of domestic purchased scrap consumed by the Japanese steel industry in the past ten years.

Meanwhile, during the past ten years, Japan imported about 4,600,000 net tons of pig iron and finished steel products from other steelmaking nations, and exported about 2,000,000 net tons of finished products. The net effect of this trade was to increase Japan's reservoir of scrap by at least 2,000,000 tons.

From the foregoing, the experts reason that Japanese industry, through its own operations and through the importation of finished steel products, created a

total of about 30,500,000 tons of usable scrap during the past ten years. Since total scrap consumption during that period amounted to approximately 32,000,000 tons, it is held probable that the remaining 1,500,000 tons were made up by the use of scrap imported from the United States.

The authorities therefore conclude that the scrap pile of the Japanese at the start of 1942 is aproximately 10,000,000 tons, which will make a lot of ammunition and guns.

The frugal Japs have enhanced their scrap holdings by large scale wrecking operations in parts of China which came under their control.

Warehouses Obtain Only 25% Of Quotas, Despite Priorities

Birmingham

• • • **Southern warehouses** are having difficulty in obtaining as much as 25 per cent of their quota on the warehouse rating of A-9, operators here report. It is practically impossible to obtain structurals and bars, and to date no plates have been allocated for warehouse distribution. Easiest item to obtain at present is black sheets.

Merry-go-rounds Give Way To War Goods

Buffalo

• • • **Production of gravity-rides, roller coasters, merry-go-rounds and other public amusement devices has been doomed until after the war, at the Spillman Engineering Corp.'s plant in suburban North Tonawanda, N. Y., and this thrill-ride company is switching to the making of war goods.**

Spillman built amusement rides for the New York World's Fair as well as for amusement centers in France, Belgium and Vienna. George H. Cramer, president, said this week the company's work now is 100 per cent on the production of defense orders, mostly on subcontracts.

Furniture Output Snagged

Chicago

• • • **If about $50,000 worth** of metals were allotted to the furniture industry it would permit release of about $70,000,000 worth of furniture in 1942, manufacturers meeting here at the National Furniture Show have estimated.

AIR-RAID SIRENS: Turning and boring an air-raid siren rotor. The siren on the right shows the construction, and estimates are that the sirens are driven at a speed of 3450 r.p.m. Many American cities are buying these sirens for warning civilians of impending air raids.

Wide World photo



David F. Austin, of C-I, Joins Iron-Steel Branch

Pittsburgh

• • • **David F. Austin,** vice-president in charge of sales, Carnegie-Illinois Steel Corp., this week joined the ranks of the recently formed iron and steel branch consultants who work under the direction of Charles E. Adams, chief of the branch.

Mr. Austin has been in steel sales work with Carnegie-Illinois Steel or its predecessor since 1927. In 1931 he became assistant manager of the Cincinnati office and was later made manager. In 1933 he became manager of sales of the Pittsburgh office of the Carnegie Steel Co. and in 1935 manager of sales, Chicago district, Carnegie-Illinois Steel Corp.

In January, 1938, Mr. Austin was appointed vice-president in charge of sales, Carnegie-Illinois Steel Corp., with headquarters in Pittsburgh.

Plywood Used for Road Markers

Lansing, Mich.

• • • **Adoption of plywood** as the material for use in marking highways in Michigan has been adopted as a policy by the State Highway Department, here. The conservation department of the state, which also posts many signs, has long used plywood instead of steel. An additional development in the highway department is a wood casing for use instead of metal plates normally required as mountings for reflector button signs.

American Radiator Official Joins Priorities Division

Washington

• • • **Appointment of** John J. Hall of Pittsburgh, as assistant to the Deputy Director of Priorities, was announced by the Priorities Division of OPM. Mr. Hall, vice-president of the American Radiator & Standard Sanitary Corp., will have a prominent part in the supervision of the activities of the Production Requirements Section of the Priorities Division.

Nelson's Power As War Board Head To Exceed Baruch's

Washington

• • • **Complete power for** mobilization of industry has been taken over by Donald M. Nelson under the President's Executive Order of last Friday, which named the former OPM Director of Priorities and Executive Director of nine-man SPAB as chairman of the New War Production Board, whose personnel consists of members of the abolished SPAB.

William S. Knudsen, former OPM Director General, was transferred to the War Department as Director of Production with the rank of lieutenant general.

Looking to a widespread reshuffling of the defense organization and speeding up of output, Mr. Nelson was clothed with authority to direct the entire war procurement and production. To emphasize the power he was given by the Executive Order, prepared by Mr. Nelson at the request of the President, Administration officials claim that his authority exceeds that granted to Bernard M. Baruch as head of the powerful War Industries Board during the first World War.

• • • **The order** directs Mr. Nelson to "determine all policies, plans, procedures and methods" of every federal agency relating to procurement and production, thus sweeping under his charge purchases and production for the Army and Navy and all other federal departments. All are required by the order to comply with Mr. Nelson's orders.

The former vice-president and director of Sears, Roebuck & Co., alone has authority to direct the war effort, according to the order, and the board he heads can only advise and assist him. Indicative of his high status, Mr. Nelson last week attended a cabinet meeting and will attend future meetings. He takes over authority to place war contracts, authority heretofore vested in the Undersecretaries of War and Navy. The Army and Navy Munitions Board will report to Mr. Nelson who in turn will report to the President on progress of the defense program. Actual placing of war orders, however, will continue to be done by the War and Navy Departments.



Associated Press photo

"LORD" NELSON: In winning the first World War, the United States had to concentrate its army-building program in the War Industries Board. On Jan. 14 President Roosevelt, after the new arms program had stumbled along under a many-headed management, appointed Donald M. Nelson (left) as chairman of a new War Production Board. Mr. Nelson is expected to speed war goods production by powers second only to the President. With Nelson is Price Administrator Leon Henderson.

• • • **Complete control** of OPM is placed in the head of the New War Production Board. He was authorized to supervise OPM and "direct such changes in its organization as he may deem necessary." Policies he lays down not only will govern production and procurement but also specifications and construction, conversion, requisitioning plant expansion and financing. Previously Federal Loan Administrator Jesse Jones had charge of financing.

Apparently the only powers not given Mr. Nelson are those over labor and price policies, the New War Labor Board having jurisdiction over the former and OPA continuing as the price regulation body.

Mr. Knudsen, praised in a statement issued by the President, will have "entire charge of directing and expediting the gigantic production involved in the War Department munitions program, with special emphasis on the production of airplanes, tanks, guns and ammunition."

The appointment of Mr. Knudsen was announced shortly after he had taken luncheon with the President.

"Bill Knudsen is one of the great production men of the world and his acceptance of this new post means that he can give his entire time to the direction and expediting of production, a field in which he has no equal," said the President's statement.

"The country is already immeasurably indebted to Mr. Knudsen and in accepting this assignment at my request, he is undertaking one of the most important tasks of the war.

"He will, of course, continue as a member of the new War Production Board."

ASM Gives Lecture Series

Rockford, Ill.

• • • **"Inspection of Metals"** is the subject of a series of seven lectures to be given every week here by the local chapter of the American Society of Metals for the benefit of persons who have entered metals work since the start of the armament program.

Iron Output 7% Over Rated Capacity Seen A Possibility In '42

By T. C. CAMPBELL and B. W. CORRADO

• • • **A survey in which** blast furnace operators and steel engineering experts in Pittsburgh, Cleveland, and Youngstown participated reveals that pig iron production in 1942 may be pushed up perhaps as much as 4,500,000 tons, or 7.5 per cent, over presently indicated capacity production by the more intensive use of existing equipment and the greater application of processes for ore and flue dust treating and coal cleaning. Opinion as to the advantages of air conditioning was generally divided, particularly so far as the advantages of its adaptation in northern steel making areas was concerned. In any event, the majority of the specialists expressed the belief that various other less expensive measures should be resorted to in blast furnace operations before air conditioning is installed in the more doubtful areas. These suggestions were made with the remainder that blast furnace operations and conditions vary widely from district to district, so that measures adaptable at certain furnaces are not practical at others.

A leading steel engineering expert believes that use of more blowing capacity at certain blast furnaces might increase their pig iron output anywhere from 5 to 10 per cent. This would increase furnace costs and would mean the consumption of additional coke and an increase in resultant flue dust, but the observer felt that with the sintering of the flue dust and its mixture with the ore finds there would be little disadvantage in resorting to this measure to increase pig iron output other than the increased costs. From the standpoint of the additional expenses involved, these naturally would be offset to some extent by the value of additional iron produced. The fact that more iron would be forthcoming from the blast furnaces integrated steel companies, thereby permitting use of a larger percentage of such concerns' open hearth capacity, would appear to entirely justify the higher costs involved.

With respect to ore treatment, blast furnace men seem to feel that much more can be done in concentrating, screening, and sintering in furnace practice and where not much of this is being done it is estimated that production might be pushed up as much as 10 per cent per furnace.

The question of greater sintering of flue dust is another important point upon which blast furnace men agree that further progress can be made. Of course, extension of this practice might not result in such a large over-all increase in iron tonnage, but whatever benefits might be forthcoming would naturally help to offset the raw material shortages facing the steel industry for the current year.

Installation of coal cleaning plants in the vicinity of various blast furnaces is estimated by some observers to have a potential production benefit of as much as 6 per cent in the pig produced at such units. The reason for this is that in the cleaning process, slate, bone and other waste would be eliminated, thereby yielding a better fuel and reducing the fuel ratio in comparison to the iron ore and limestone tonnage fed into the blast furnace. Another factor that is regarded as an aid to production would be the use of low volatile coal.

As the blast furnaces now planned for construction will not become available until late 1943 and early 1944, the industry has been attempting to enlarge units whenever operations are halted due to repairs. This trend is strongly approved by industry observers, inasmuch as it is a swifter job and the more effective measure is expanding the industry's capacity. Of course, blast furnace enlargement has certain handicaps, such as the fact that approximately 100 days are required in the normal enlargement of a furnace. Thus, in enlarging a 700-ton unit up to a 1000-ton daily capacity, the necessary construction work would result in a production loss of 70,000 tons of iron, which could not be made up by the enlarged furnace until 233 days later, when the full benefits of the enlargement would be reaped.

Thus, it would be of little aid to our 1942 iron output to blow out a furnace solely for the purpose of

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BOMBER BUMPERS: To cut balloon barrage cables, the Germans have designed bumpers to be fitted on the wings of bombers (above). But weight of the bumper greatly reduced the plane's speed and lowers its bomb-carrying capacity.

Wide World photo

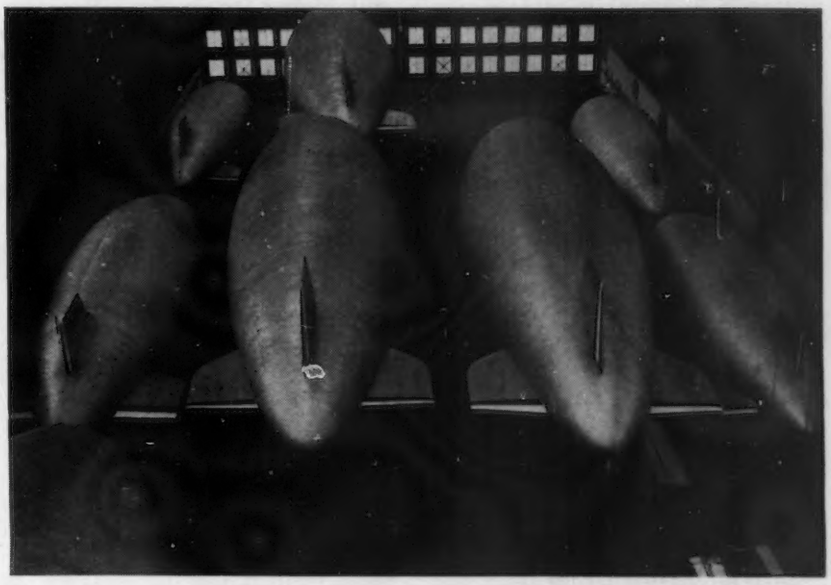


its enlargement. Rather than that, the industry will do this work on units that are down for repairs and relining, which in itself is normally a six weeks' job. Thus, if the foregoing theoretical case of a 700-ton furnace was enlarged to 1000-ton capacity, while in process of undergoing other necessary repairs, the actual production loss beyond the enforced idleness of six weeks amounts to approximately 58 days or 40,600 tons. The latter tonnage loss could be made up within 133 days by the enlargement. Naturally, some units have been enlarged only as much as 20 to 30 per cent, although requiring approximately 100 days for the necessary work, so that in such cases it will take a much longer period to make up the tonnage lost during the idle period. As a result of these limitations and potentialities, most companies are planning to enlarge furnaces, where such work is possible, only at the time when operations have to be halted for some other reason.

It is pertinent to note that about 7 blast furnaces were enlarged in 1941, four new furnaces were built, while six other new furnaces were started, although more enlarging and more new construction will be possible in 1942 with the aid of longer hours by expanded personnel of steel engineering concerns. Nevertheless, the extent of furnace enlargement that is possible in 1942 will be directly limited by the amount of new blast furnace work that is being done, because of the capacity of steel fabricating concerns who do the necessary work.

Enlargement of furnaces where new blowing equipment will be necessary will face the continued bottleneck in turbo blowers for which deliveries are now quoted at 16 to 18 months. The use of additional blowing equipment at certain furnaces is handicapped by the fact that such action would necessitate increased stove capacity and increased blower capacity, which is not easily made available. On the other hand, most observers feel that those furnaces which might use more blowing capacity actually have available, but idle, additional stove capacity and blower capacity. Frequently, the old blowing equipment, which has been replaced in recent years by turbo-blowers, is still on hand at the various furnaces, while improved blast furnace practices have permitted many units to operate with three stoves instead of the four that were actually available. As a consequence, the more intensive driving of blast furnaces could well be aided by the use of idle equipment despite increased costs and certain uneconomical practices.

The widespread adoption of air conditioning is doubted by many observers as being an effective and very desirable means of increasing the national output. It is pointed out that in northern steel making areas the moisture grains per cubic foot of air from winter to summer show a difference of as much as four to five grains, whereas air conditioning is claimed to be able to increase production by removing three to five grains of moisture from the air. If the reduced amount of moisture would result in increased production, it then is strange to report that no great gain in output has been observed by northern blast furnace operators during the winter months when moisture content of the air drops to 1.44 grains per cu. ft., as



Associated Press photo

BLIMP NEST: The large blimps in this photograph, taken at a hangar on the Atlantic seaboard, are used in sea patrol, the smaller tanks for training.



British-Combine photo

TANK CONVEYOR: Shown above is one of the widely publicized German 8-wheeled armored cars now in use against the British in Libya. The car is being sent back to the (British) desert base on a tank conveyor.

against 6.40 grains in midsummer. As a matter of fact, new production records made by many blast furnaces in northern areas have been set during the summer months. Certainly, if the moisture content of the air was directly reflected in production, the records at northern blast furnaces should all be set in winter months and output should increase during such periods.

A very interesting aspect of the criticism of the dry blast method offered by furnace operators is that they frankly admit they would very much like to have air conditioned units for the sake of the uniformity of operation that is possible with air conditioning. Yet, they do not appear too optimistic over its possibilities in increasing production.

Several blast furnace men express the hope that the government may sponsor operations tests at certain representative furnaces recorded by official observers so that it may be honestly noted beyond any shadow of doubt just what the individual benefits and handicaps are in adopting various furnace techniques. The seriousness of the raw materials situation and our involvement in war are regarded as two compelling reasons why this should be done at present.

Suggestions were made that ore mining during the war be concentrated upon deposits which are chemically and physically best. This would naturally increase the iron content of the ore and permit higher iron yields. Moreover, movement of ore down the lakes might be quickened by removal of moisture content at the lake heads to allow the transportation of more ore and less water by the lake boats. In this connection, furnace men appreciate that the ore would have to be dampened down again at the furnaces to minimize the flue dust, but the idea was presented as a means of increasing the ore movement. Furthermore, it is appreciated that considerable equipment would have to be installed at the lake heads to make this possible, and the time required would not aid the 1942 ore movement.

One observer expressed the thought, based upon experiments, that under certain conditions an increase of 150 deg. in blast furnace temperature would give as much benefit in furnace production as the removal of 3 grains of moisture through air-conditioning is reported to yield. This may account for favorable furnace practice during high moisture months and would justify opposition of the dry blast method. It is pointed out that a comparatively high moisture content in the air yields certain operating benefits, which, while individually small, are lost in dry blast practice.

It is reported that Federal officials may consult with blast furnace operators in Washington during the near future to elicit suggestions and ideas of how our pig iron production might be increased. If the measures noted in the foregoing summary could be adapted at various furnaces which are not now practicing them, it is possible that as much as 4,500,000 tons of additional iron might be produced in 1942 without waiting until additional new furnaces are completed during the next few years. This additional amount of pig iron would certainly go a long way to offset the growing shortage in scrap and the inability of present blast furnace capacity to make up the entire difference.

ORE LOADERS: These "Moliloaders" are being used in handling loose grain iron ore in the Mesabi open pits. Mounted on Caterpillar tractors, the unit loads forward, and unloads into waiting trucks backward. Bucket capacities range from 2.7 to 9.5 cu. yd., and loaders are made by the Athey Truss Wheel Co., Chicago.



Ohio Gets New Airport and $10 Million Propeller Plant

Cleveland

• • • **Work is proceeding seven** days a week on the new $10,000,000 American Propeller Corp. plant which will manufacture propellers for military aircraft. Work is also under way by the newly incorporated National Aviation Corp. on a 280-acre airport near the plant site, which is in Ohio. Completion of the airport development, planned for testing purposes, is expected in May.

Huge Transport Gliders Delivered to Air Corps

• • • **The first of the new** motorless, transport gliders for the Army air forces, has been delivered to Wright Field, the Air Corps' great experimental station near Dayton, Ohio. Designed to carry air-borne infantrymen with full fighting equipment or supplies of equal weight, these gliders have wing spans of over eighty feet. Several of them can be towed behind a single bomber or transport airplane.

Plan Seamless Tube Service

• • • **The Seamless Steel Tube Institute,** Pittsburgh, announces a new information service on grades and sizes of seamless steel tubing. The service is expected to help firms which have recently entered war equipment production.

May Double $53 Million Plant

Chicago

• • • **The $53,000,000 Wabash** River Ordnance Works under construction in Indiana may be doubled in size, according to reports.

Canadian War Contracts Step Up Imports From U. S.

Toronto

• • • **Steady outpouring** of war contracts by the Department of Munitions and Supply has caused a gain in demand for finished and semi-finished steel in Canada and a substantial increase in imports from the United States, especially in ship plate where domestic production falls far short of meeting requirements. For the period Dec. 31 to Jan. 6, the Department placed contracts valued at $11,998,151, which included orders valued at $57,926 to two United States companies, and a single order for ordnance totaling $8,026,263. Awards include:

Ordnance—Ford Motor Co. of Canada, Ltd., Windsor, Ont., $8,026,263; Delamare & Williams, Ltd., Toronto, Ont., $24,732; Hall Machinery Co., Sherbrooke, Que., $57,195.

Munitions—T. W. Hand Fireworks Co., Ltd., Cooksville, Ont., $118,800; Viceroy Mfg. Co., Ltd., Toronto, Ont., $5,539; A. Deslauriers & Fils, Ltee., Quebec, Que., $7,970.

Land transport—Eastern Steel Products, Ltd., Montreal, Que., $19,800; General Motors Products of Canada, Ltd., Oshawa, Ont., $98,492; Dominion Tire & Rubber Goods Co., Ltd., Toronto, Ont., $37,185; Gutta Percha & Rubber, Ltd., Toronto, $32,350; Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., $31,689; B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., $24,440; Chrysler Corp. of Canada, Ltd., Windsor, Ont., $8,003.

Aircraft—Overseas Requisition, London, England, $86,940; Fairchild Aircraft, Ltd., Longueuil, Que., $35,277; Aviation Electric, Ltd., Montreal, Que., $14,435; Noorduyn Aviation, Ltd., Montreal, $8,118; Laurentian Metal Products, Aylmer, Ont., $8,653; Campbell Steel & Iron Works, Ltd., Ottawa, Ont., $5,274; Ottawa Car & Aircraft, Ltd., Ottawa, $16,043; Peterborough Canoe Co., Ltd., Peterborough, Ont., $14,428; National Steel Car Corp., Ltd., Malton, Ont., $11,212; DeHavilland Aircraft of Canada, Ltd., Toronto, Ont., $147,726; Progress Engineering Co., Toronto, $57,600; Weaver Industries, Ltd., Chatham, Ont., $31,820.

Algoma Starts $17 Million 500,000-Ton Expansion

Toronto

• • • **Algoma Steel Corp., Ltd.,** Sault Ste. Marie, Ont., is entering into a $17,000,000 plant expansion program to be completed in 1943, and to be financed by the Canadian government. The company's steel production will be increased by about 500,000 tons per year. The plan provides for extensions and rehabilitation of present plant facilities, including rolling mill departments, to be completed by August. Additional coke ovens will be installed, an old blast furnace will be rehabilitated and is expected to blow in in August, and a new blast furnace will be completed in 1943. The proposed enlargements will provide an additional 1000 tons of basic pig iron per day and 300 tons of foundry or malleable iron. The increase in pig iron production is said to be necessary owing to depletion of scrap iron resources in Canada.

War materials production in Canada this year will require about 4,000,000 tons of steel, including alloy and armor plate. Of this total about 1,750,000 will have to be imported from the United States. The stepping up of Canada's war output from time to time, may considerably alter this estimate within the next few months.



Globe Photo

WOMEN IN INDUSTRY: Because of the need for men in the armed forces, more women are daily being trained to operate machines making war goods. This girl is working on a speed lathe, polishing studs, for the Rock Island Arsenal.

3000 Trucks Order To Canadian Chrysler

• • • **Chrysler Corp.** of Canada, Ltd., has received an order for 3000 trucks for the air force and army, to be delivered early this year, J. H. Berry, director general of automotive production in the Department of Munitions and Supply has announced.

Safety Classes Started

• • • **The Detroit** Industrial Safety Council has begun a series of weekly classes in safety for industrial supervisors. The classes are a step in a campaign against a steadily mounting toll of accidents in civilian and defense production plants here. The accidents are attributed to the fact that new workmen are being put on jobs with which they are not entirely familiar.

Canada Requires Permits For Certain Uses of Steel

Ottawa, Canada

• • • **F. B. Kilbourn,** Canadian Steel Controller, has issued a new ruling to the effect that use of steel plates, structural shapes and bars for necessary maintenance and repairs will be allowed without permit. He also ruled that without permit, steel manufacturers—comprising steel fabricators and industries using steel in the manufacture of their products—are permitted to order their needs from primary steel producers, rolling mills, wholesalers and jobbers.

J. R. Nicholson, Deputy Controller of Supplies, has issued an order which stops production of a number of lines of household electrical equipment and drastically reduces output of others. After Jan. 30, manufacture is banned of any electric grills, percolators, stoves for glass coffeemakers and electric tea kettles. After April 29, manufacturers will not be permitted to sell or display these articles, but wholesalers and retailers will be allowed to dispose of stocks on hand. Manufacture of electric irons, toasters and household fans is placed on a 50 per cent quota based on production during 1940. Parts for repair of existing electric appliances are exempt from the order, and permission will be given for manufacture of any of the articles when ordered by the Department of National Defense or Munitions and Supply.

Farm Equipment Union Urges Concentration of Production

Chicago

• • • **Concentrating of farm** equipment production in fewer plants to free others for war production is being urged on the industry by the Farm Equipment Workers Organizing Committee (CIO). Union spokesmen claim that the industry could convert to war production faster in this way and reduce unemployment, which is growing steadily; about 15,000 out of 96,000 on the industry's payroll are now laid off. The union contends that enough farm equipment could be produced by this concentration if piece work, which has long been a bone of contention, model changes, and secondary equipment such as hay rakes, etc., were eliminated. The union has also urged the adoption of the Murray plan which provides for a joint union-management administrative board to handle not only labor but all management problems of the industry.

"Black-Out" Paints Perfected by 2 Firms

Cleveland

• • • **"Black-out" paints** have been perfected by Sherwin-Williams Paint Co., and the Arco Co., two Cleveland concerns. The new Sherwin-Williams blackout paint for industrial uses is non-reflective and weather-resistant. The paint meets requirements of the Office of Civilian Defense and can be used either on the inside or outside of glass.

The Arco paint has unusual heat deflecting qualities, is being manufactured in seven shades that are hard to see from the air and is already in use on certain government properties. The heat deflection obtainable in the darker colors will be of particular value to public utilities, oil producers and refineries, according to President Paul L. Hexter.

Sherwin-Williams advises householders to paint windows with light colored paint before giving them the real blackout coating, in order to reflect the light and make the room inside seem brighter.

MAN MASTERS THE ELEMENTS: The great concrete structure that will be Shasta Dam reaches up into the clouds in this view of the west abutment section. More than a city block thick at the base, the dam will be 602 ft. above its lowest foundation in the center. This section, now up 295 ft., will be 520 ft. high when completed.



Open Compressed Air Contest

• • • **A contest designed** to influence inventiveness in the application of compressed air is announced by the Compressed Air Institute, East Orange, N. J. Prizes of $100, $50 and $25 will be awarded for papers describing some phase of compressed air usage not generally known. The contest closes June 1. Copies of rules may be obtained from the Institute's educational committee at 45 Warrington Place, East Orange.

Trade Notes

The C. B. Fall Co., 915 Olive Street, St. Louis, has been appointed representative for Ajax Electric Co., Inc., in Kansas, Missouri, Arkansas, and Southern Illinois.

•

Wackman Welded Ware Co., New Orleans plant, has moved to 848 First Street, Gretna, La., suburb of New Orleans.

•

Richmond-Chase Co., 380 Stockton Avenue, San Jose, Cal., food canner and packer, plans one-story addition for expansion in processing and canning departments. Cost over $40,000 with equipment.

•

The International Nickel Co., Inc., has moved the Detroit office of its development and research division from the tenth floor to the eighth floor of the General Motors building.

•

Seamless Products Co., Inc., has moved its office to its factory at 503 West 56th Street, New York.

•

Day & Zimmermann, Inc., Philadelphia, has received an order from Pittsburgh Ferromanganese Co., Chester, Pa., for two 22 x 100 ft. hot blast stoves with welded steel shells, brick linings, piping, valves and gas burners.

•

The Rumsey pump plant, purchased in 1941 by K. R. Wilson of Buffalo, has been sold to Balch Morris, Inc., New York, a new corporation, which will make parts and subassemblies for medium tanks.

Heavy Penalties for Priority Violators Asked in War Bill

Washington

• • • **The most drastic** steps yet taken to enforce the priority system are proposed in the Second War Powers bill now being considered by the Senate Judiciary Committee. This bill provides for fines of $10,000 and imprisonment for one year as the maximum penalty for proven priority violators.

In addition to this new weapon to enforce adherence to priority rules, the bill also contains provisions for giving the armed forces all out power to requisition any machine deemed necessary for war work, regardless of how that machine is now being used. Present requisitioning powers under the selective Service Act are limited to machines and equipment which are not in actual use and which are not necessary for the operation of a business.

In discussions of the bill before the Senate committee it was asserted that OPM investigations had shown widespread violation of priority regulations, which at present can be punished only by such "admistrative sanctions" as withhold priority assistance, or cutting off fuel and power supplies from a plant.

Administrative sanctions have already been applied to several alleged violators of priority regulations in the form of removing priority assistance from such plants. In cases where a plant requires scarce materials, this is tantamount to closing the plant down. These actions were taken in the form of issuance by OPM of an "S," or suspension, order directed against a spceific violator. (See page 4 of THE IRON AGE Priorities and Allocations Guide of Nov. 27, 1941.)

It was reported at the hearings that Donald M. Nelson, chief of the new War Production Board, has approved of the provisions of the war powers bill.

Oil Plants Get Rating

• • • **OPM last week imposed** priority control over all branches of the petroleum industry by issuing preference rating order P-98. The order assigns priority ratings from A-1-a to A-10 for deliveries of materials to be used for specified purposes in the production, transportation, refining, and marketing of petroleum and petroleum products. Ratings are also assigned for the production, and certain types of transportation of natural gas.

At the same time, the construction of new facilities or improvement of existing facilities, including filling stations, is forbidden by an amendment to conservation order M-68-c except by permission specially granted by the Director of Priorities. However, construction or improvement begun before Jan. 14, which will be completed within 60 days may be carried out. Otherwise exceptions will be made only when the Director of Priorities finds that new construction or improvement is necessary. The amended order permits the completion of wells in process of drilling at the time when the order was originally issued.

Since these orders govern all priority assistance extended to the petroleum industry, operators of petroleum enterprises will no longer be entitled to apply preference ratings assigned by General Preference Orders P-43 and P-100, which apply to research laboratories and to general maintenance, repair and operating supplies. Priority assistance designed especially for supply houses which serve as inventory for the industry has already been granted by General Preference Order P-83, which was issued Dec. 8, 1941.

Copper Users Must File

• • • **Manufacturers of** copper products were warned last Friday that if they are using copper or copper base alloy in the manufacture of articles on list "A" of order M-9-c and have not filed form PD-189, they are in direct violation of law and must file the form immediately.

List "A" includes more than a hundred less essential civilian items. The use of copper in the manufacture of these items is prohibited after March 31, 1942. Manufacture is permitted from Jan. 1 to March 31 under certain conditions.

The extension in time to March 31, afforded by paragraph (A)(4) of the order is not available to manufacturers unless each of the four conditions set forth therein, one of which is the filing of form PD-189, is met. The form should be filled out and returned to the Copper Branch, Office of Production Management, Washington, at once.

Import Control Extended

• • • **Seven additional** materials have been brought under the terms of General Imports Order M-63. OPM has announced that an amendment to the order, effective Jan. 13, adds hides and skins, asbestos from South Africa, rapeseed oil, cocoanut oil, copra, palm oil and tung oil to the fourteen materials already covered.

Tin Order Revised

• • • **Regular customers** requiring small amounts of tin, who were permitted to get five ton lots monthly under order M-43 without specific authority of the Director of Priorities, are now restricted to three ton lots and no more than five ton lots from all suppliers, according to a new amendment. The user must file with his purchase order a certificate of compliance with the terms of M-43. The amendment also redefines the term "distributor" to include warehousemen and jobbers.

Health Supplies Exempted

• • • **Health supplies** were exempted from the restrictions of the copper conservation order M-9-c, by an amendment issued by OPM. Health supplies as defined in order P-29 are added to list "B" of M-9-c and take whatever rating is assigned by the Health Supplies Branch.

Builders' Procedure Altered

• • • **An amendment to** OPM's preference rating order, P-55, provides that manufacturers supplying building materials for defense housing projects should hereafter

THIS WEEK'S Priorities and Prices

Lead prices increased and formal maximum prices established in schedule No. 69 issued Jan. 13. (OPA: PM2157). Manufacturers of metallic lead products and pigments requested not to sell above Jan. 2 price levels. (OPA:PM2162). Ceiling prices for lead scrap and secondary lead established in price schedule No. 70 issued Jan. 13. (OPA:PM2161)

Tin and lead foil Order L-25 revoked Jan. 15. Restrictions contained in Orders M-31-a and M-38-c said to cover the matter adequately. (OPM:PM2197)

Copper product manufacturers warned that they may not use copper for materials in list A of Order M-9-c unless they have filed PD-189. (OPM: PM2219)

Training classes for welders granted priority assistance in obtaining steel plate and welding electrodes for practice work in Order P-92 issued Jan. 17. (OPM:PM2224)

Sodium nitrate placed under full allocation system, beginning Feb. 1, in Order M-62 issued Jan. 15. (OPM:PM2195)

Leather tanners requested to file data concerning production, sales and prices to permit reviewing Price Schedule No. 61. (OPA:PM2222)

Machine tool Order E-1-a revised issued Jan. 13. New order replaces Supplement No. 1 to Order E-1, includes new Master Preference Numerical List and extends controls to gages and chucks. (OPM: PM2147)

Truck, trailer and passenger car sales banned until Feb. 2, after which time a rationing plan is expected to go into operation. Previous ban expired Jan. 15. (OPM:PM2173)

Tin deliveries permissible without OPM approval reduced from five tons monthly to three tons in amendment to Order M-43 issued Jan. 14. Amendment also redefines term distributor to include warehousemen and jobbers. (OPM:PM2155)

Asbestos from South Africa, hides and skins, rapeseed oil, cocoanut oil, copra, palm and tung oil added to list of materials under import control in Order M-63, issued Jan. 12. (OPM:PM2159)

Ferrochrome may not be melted in amounts exceeding two tons a month without specific authorization from OPM, according to amendment to Order M-18-a issued Jan. 13. (OPM:PM2146)

Copper, lead and zinc production increase planned under new program of premium payments sponsored by OPA, OPM and Metals Reserve Co. (OPM: PM2160)

Aluminum scrap price schedule No. 2 revised to encourage more intensive segregation of plant scrap according to form and content. New prices coincide with revisions to Order M-1-c previously announced. (OPM:PM2150)

Petroleum industry granted priority assistance in obtaining material for production, refining, transportation and marketing in Order P-98 issued Jan. 14. Another order, M-68c, prohibits new construction or improvement, including filling stations, without specific permission. Other changes announced in Order M-68 concerning completion of wells in process of drilling on Dec. 23, 1941. (OPM: PM2151)

Building material manufacturers supplying materials for defense housing projects instructed to apply for priorities on form PD-25a. (OPM:PM2148)

Tire rationing relaxation at present time termed "dangerous and foolhardy" by OPA. Proposed expansion of synthetic rubber output will take at least 18 months, it was said. (OPA:PM2185. Tire rationing regulations revised to cover only trucks "designed for use on the highways." This change seen exempting trucks used wholly for inter-plant work from rationing regulations. (OPA:PM2138)

Jewel bearings and materials placed under full allocation in Order M-50 issued Jan. 14. (OPM:PM2170)

Cashew nut shell oil deliveries and use restricted by Order M-66 issued Jan. 13. (OPM:PM2144)

Health supplies exempting from restrictions of copper Order M-9-c in amendment issued Jan. 13. (OPM: PM2153)

Copper scrap price schedule No. 15 revised Jan. 15. Revision affects premiums on less than carlot shipments. (OPA:PM2172)

Cadmium prices placed under a ceiling in schedule No. 71 issued Jan. 16, covering both primary and secondary metal. (OPA:PM2231)

Steel screen cloth removed from terms of price schedule No. 40 on Jan. 15. (OPA:PM2200)

Hide glue stock placed under schedule of maximum prices announced Jan. 14, schedule to become effective Jan. 20. (OPA:PM2156)

Wastepaper price schedule No. 30 amended. (OPA: PM2196)

Formaldehyde price schedule No. 21 amended on Jan. 15. (OPA:PM2201)

Preference rating assignment and extension simplified and made more uniform by Priorities Regulation No. 3. Order abolishes present forms PD-1 through PD-5 after Feb. 2 and replaces these with PD-1a and PD-3a. (OPM:PM2130)

Burlap allocation order M-47 amended Jan. 19 to permit certain manufacturers to process up to 10 unbroken bales. An interpretation issued the same date clarifies contributions of importers to reserve pool. (OPM:PM2220)

Tire sale restriction order M-15-c amended Jan. 15 to permit eligible users of light truck sizes to buy tires. Restrictions on sizes used by trucks 10 years or more old tightened. (OPA:PM2225)

Cadmium use for other than war work drastically curtailed in orders M-65 and M-65-a issued Jan. 17. Maximum prices established in schedule No. 71 issued Jan. 16, covering primary and secondary metal. (OPA:PM2231)

Preference orders extended include P-77 to April 1, 1942.

• • •

For copies of above announcements address defense agency concerned at Washington, giving announcement number as shown in parentheses after each paragraph. (For example, OPM:PM200 *means announcement* 2000 *issued by Office of Production Management*).

apply for priority assistance under the recently announced Production Requirements Plan (P-90). This plan permits a producer to get materials for three months at a time. Under the new procedure the affected manufacturers may not extend the rating assigned to the project, but will apply on form PD-25A for assistance.

↓ ↓

Chrome Control Tightened

• • • **An amendment** to order M-18-a, announced last week by OPM, prohibits any person from melting more than two tons of ferrochrome in any one month without specific authorization. The amendment is intended to prevent using up inventories of ferrochrome to fill less essential rated orders for chromium steel. To-

gether with M-21-a, the chrome steel order, this regulation is designed to limit chromium steel to vital military needs.

Tin, Lead Foil Order Revoked

• • • **The tin and** lead foil order, L-25, was revoked last Thursday by OPM because limitations on the use of these materials are contained in orders M-43-a and M-38-c.

Deoxidizing Supplies Hit

Washington

• • • **Aluminum for** the deoxidizing of steel and for alloying purposes will soon be restricted by OPM to 0.6 lb. per ton for deoxidizing carbon steel, 2 lb. per ton for alloying of steel and for deep-drawing steel. The restriction is also applicable to carbometer wire used for testing.

Grade B aluminum, running from 90 to 94 per cent aluminum, is directed to be used in deoxidizing and grain control of alloy steels in both the open hearth and the electric furnace, and Grade C, 88-90 per cent, and D, 82.5-88 per cent, are restricted to carbon steels. Grades of aluminum, 99 per cent and above, and Grade A, 94-98 per cent aluminum, may be used in alloying steel. The making of deep-drawing steel, formerly used in automobile body manufacture, is being discouraged, OPM officials say.

Cadmium Use Curtailed

Washington

• • • **Cadmium, frequently** substituted for chromium as a rust resisting metal, may not be used after April 1 with certain exceptions. They are government agencies, requirements for underwriter and safety regulations, and on contracts and orders bearing preference ratings down to but not including A-2 of a list of products and purposes.

OPM took this action Jan. 17 by order M-65a, and at the same time imposed restrictions on the distribution of the metal by order M-65.

The use of the metal in more than 50 items and categories is forbidden after Feb. 1.

Welding Classes Aided

• • • **OPM has issued** Preference rating order P-92 giving priorities assistance for deliveries of steel plate and welding electrodes used in the operation of defense training classes for welders under the United States Office of Education whose program has been set up in 22 states. More than 15,000 welders in vocational schools are being trained.

No specific preference rating has been assigned to deliveries of steel plate and welding electrodes. The rating, OPM said, will be determined from time to time.

Revisions for The Iron Age Priorities Guide

• • • Following revisions are to be made to The Iron Age Allocations and Priorities Guide, published Nov. 27. This material should also be adequately indexed on pages 1 and 2 of the Guide.

Under "P Orders," pages 3 and 4, add:

P-55—Amended to enable manufacturers to apply on form PD-25a. (1-12-42)

P-92—Steel plate and welding electrodes for welders' training classes. Related form: PD-183.

P-98—Petroleum industry. (1-14-42)

Under "M Orders," page 5, add:

M-9-c—Amendment. Exempts health supplies from restrictions. (1-13-42)

M1-18-a—Amendment. Prohibits melting more than 2 tons of ferrochrome monthly except with specific permission. (1-13-42)

M-43—Amendment. Reduces amount of tin which may be shipped without OPM authorization from five tons monthly to three tons. (1-14-42)

M-50 — Establishes allocation system for jewel bearings and materials. (1-14-42). Related forms: PD-235, PD-236.

M-62—Sodium nitrate placed under full allocation system. (1-15-42)

M-65a—Cadmium use curtailed. (1-17-42)

M-66—Establishes restrictions on deliveries and use of cashew nut shell oil. (1-13-42)

M-68—Amendment. Permits completion of wells in process of drilling on Dec. 23, 1941. (1-14-42)

M-68-c—Prohibits expansion of facilities without permission of OPM. (1-14-42)

M-63—Amendment. Adds following to control list: asbestos from South Africa, rapeseed oil, cocoanut oil, copra, palm oil, tung oil.

Under "L Orders," page 4, add:

L-25—Tin and lead foil. Revoked Jan. 15, 1942.

Under Miscellaneous Orders, page 4, add:

Priorities Regulation No. 3 (1-12-42). Abolishes use of PD-1 to PD-5, which are to be replaced by PD-1a and PD-3a. Also simplifies methods of assignment and extension of ratings.

Under "E Orders," page 4, add:

E-1-a, Revised — Contains new Master Preference Numerical List; adds chucks and gages to items, controlled by order.

Under "OPA Price Ceilings," page 5, add:

No. 69—Primary lead. (1-13-42)

No. 70—Lead products and pigments.

No. 70—Scrap and secondary lead. (1-13-42)

No. 71—Primary and secondary cadmium. (1-16-42)

Urges Close Scrutiny Of Idle Furnace Reports

Philadelphia

• • • **Recent unfavorable** reports of furnaces being idle because of lack of scrap should be examined very closely and in some cases will be found not entirely true, said E. C. Barringer, secretary, Institute of Scrap Iron & Steel, Inc., speaking before the Philadelphia scrap chapter last week.

He asserted that while furnaces at Youngstown, Buffalo and Johnstown were reported down for lack of scrap, there was also a blast furnace down at Youngstown, while at Buffalo the sheet mills were down and at Johnstown there was no appeal to OPM for scrap.

Weekly Roundup of Price Developments of

Steel Warehouses Appeal for Relief From Schedule 49

• • • **The controversy surrounding** Price Schedule No. 49, covering resale of iron and steel products, flared higher this week. The American Steel Warehouse Association formally applied for relief, asserting the order contains numerous hardships and inequities, and is hampering the war program.

Ever since it was announced in December, the price order has been the subject of stormy arguments. Exporters at New York, fearing bankruptcy, brought immediate complaint, followed by many other steel sellers affected by the measure. All told the orders applies to thousands of sales outlets and all their customers. The Steel Warehouse Association alone has 400 members who serve over 200,000 accounts.

Although the warehouse price ceiling was designed to eliminate overcharging and to restrict warehouse sales to definite warehouse area limits the effects of this ceiling price so far, it is said, has actually retarded national defense effort.

For Possible Late News on Price Control, see Page 98

The assumption that major warehouses maintain complete lines of steel stocks evidently was taken in setting up Price Schedule 49, and has caused some of the more important criticism of the order. Some warehouses in a given area may not have the material requested, with the result that the customer shops around and finds it at some distant point. Because the order is defense business, the warehouse at the distant point is obligated to fulfill the order which in many cases has meant a reduction of close to $3 a ton on the material involved. Some authorities say dislocated tonnages of this nature should be sold on the basis of f.o.b. shipping point price plus the freight without the $3 a ton absorption which is now contained in the order.

Losses Are Cited in Warehouse Appeal

• • • **Examples of hardships cited in the appeal by the American Steel Warehouse Association for revision of Price Schedule 49, include:**

"A Boston warehouse, selling a given steel in Boston for $3.96, would be compelled if the sale were made in Bangor, Maine, to deliver it there for $3.46.

"On April 16, 1941, the price of hot rolled bars sold in New England outside of Boston was $3.60 base Buffalo, plus the less-than-carload freight rate to the New England destination. This price was $2 per ton higher than the corresponding price in Boston metropolitan area. Under Price Schedule 49, the price to any point in New England is cut to $3.25 Buffalo base, plus the less-than-carload freight rate to destination. This results in a reduction of $7 per ton."

Theoretically if all warehouses maintained full stocks, which they are now unable to do because of the defense and war programs, the question of shopping all over the United States for a much-needed item would not present itself and hence the criticism of reduced prices instead of frozen prices would not be a point in question. However under today's conditions orders which probably should be filled are not being filled, customers are unable to get supplies and the trade in general is confused. The huge amount of paper work and the unbalancing of a distribution setup which has been built up over a number of years has been disquieting to the industry as a whole.

In the appeal to Leon Henderson, price administrator, the Warehouse Association, said, "The inequities of the order (Price Schedule No. 49), now becoming increasingly apparent, are such, and their results so disastrous, that they cannot be permitted in fairness to continue."

The Association, without attempting to catalog all the provisions which call for revision, said the schedule works the following hardships:

"1. The order operates not merely to fix a price ceiling, but in practical effect it introduces widespread changes and confusion in the economies of steel distribution.

"(A) The order in effect bars warehouses from the carload market, and requires quantity shipments to be made only by mills.

"(B) The order restricts warehouses to certain trade areas, and by a price wall bars them from other markets.

"(C) The order in its "mixed carload" provision is uncertain and ambiguous and compels a needless abandonment of the usages of the industry.

"2. The order, while its declared intent is to fix prices as of April 16, 1941, in fact reduces prices in many areas far below that level, and in certain cases puts them below cost without allowance even for the cost of handling.

"3. The order results in needless delay in the fulfilment of calls for car lots of steel, virtually all of which are urgently needed by war industries.

"A. Exhausting delays of necessity must occur before the matter can be cleared through already congested government offices, and

"B. The industry is thus forced to operate in the uncertainty of prices to be fixed upon some unspecified and, therefore, unknowable standard.

"4. The order imposes staggering burdens upon the industry with respect to the keeping and forwarding of records to Washington.

"(A) Is information called for with respect to 'sales'—which is the word used—or is 'shipments' meant?

"(B) Whichever is intended, is the information specified desired with respect to any single 40,000 lb. sale or shipment 'in any calendar month,' or is the information called for in the event sales (or shipments) to any single customer in any month in the aggregate amount to 40,000 lb. or more?

"(C) Is it intended to include sales made for direct shipment from producers to warehouse customers?

"(5) The order creates many other ambiguities and injustices which call for correction."

Aluminum Scrap Revisions

• • • **Amendment No. 6** to Price Schedule No. 2 (aluminum scrap), issued Jan. 13, breaks the schedule into two classes, plant scrap and obsolete scrap, and provides a premium price on segregated aluminum borings and turnings. All segregated solid plant scrap except 2S (pure aluminum) has been eliminated from the schedule. A one-cent differential has been established between segregated and unsegregated (mixed) turnings and borings. This facilitates the operation of the segregation order M-1-d, which requires that every plant producing as much as 1,000 lbs. of aluminum scrap per month shall segregate its scrap by alloy specification and also by form. The adjoining two-column table shows the new maximum prices.

ents of Interest to Metals Users and Producers . . .

Copper Schedule Amended

• • • **Premiums on** less than carload lot shipments of copper from refineries were revised in an amendment to the copper price schedule (No. 15) issued Jan. 14. Features of the amended schedule include:

(1) A reduction of ¼-cent per pound in the premium which may be paid on producer sales of small lots of casting copper.

(2) A change in the ceiling on less than carload lots of copper, other than casting, to a 12⅛-cent per pound price at the refinery, as compared with the previous 12½-cent price, delivered at Connecticut Valley points.

(3) A provision permitting any person to sell copper to the Metals Reserve Co., or any other government department, agency or corporation previously approved in writing by OPM at prices higher than the stated maximum prices.

(4) Discontinuation of a previous provision allowing dealers to resell their copper inventory purchased over 12 cents per pound at a base price of 12½ cents. Such dealer stocks are now exhausted.

(5) Reduction of the period for keeping records of sales from five years to one.

Two changes were made in the casting copper field. The breakpoint set forth in the original order was changed from a minimum carload of not less than 40,000 pounds, to a 20,000-pound quantity. Second, the premium on sales of less than 20,000 pounds was reduced to ¼ cent. In the original schedule, a premium of ½ cent per pound was permitted on less than 40,000-pound lots. The schedule has also been amended to make clear that no dealer in casting copper may charge a premium over the maximum prices for producers.

OPA Names Seven Regional Price Chiefs

• • • Appointment of seven regional price executives was announced Jan. 15 by OPA. The cities in which they will be located and the names of the men are: Atlanta, R. Preston Brooks; Dallas, Emmet Redford; Kansas City, Jonathan Richards; Chicago, George Benson; Boston, Frank Beane; New York, James F. Bogardus; San Francisco, Norman Buchanan.

Other new offices of OPA include: Cleveland. 363 Union Commerce Building, Birkett Williams; Dallas, Tower Petroleum Building, 1907 Elm Street, Max McCullough; Kansas City, Mutual Interstate Building, 405 E. 13th Street, D. L. Nicholson.

Cadmium Ceilings Set

• • • **Formal price ceilings** on primary and secondary metallic cadmium have been established in Price Schedule No. 71, issued Jan. 16 and effective Jan. 19. With cadmium required for both military and essential civilian needs, OPA explained that "prices of secondary cadmium have advanced far beyond those of primary cadmium and tend to make it impossible for persons in the trade to cooperate with the government in maintaining price stability."

Maximum primary and secondary prices are as follows:

Type or Shape	Maximum Price, Per Pound, Delivered
Anodes, balls, disks and all other special or patented shapes	95c.
Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other regular straight or flat forms	90c.

The above prices are delivered prices before discounts of any nature have been deducted. Deductions for percentage and character of impurities should be made according to customary trade practices.

Maximum Prices For Aluminum Scrap

(Amendment No. 6 to OPA Price Schedule No. 2, Effective Jan. 13, 1942)

(In cents per pound, f.o.b. shipping point)

Grade*	I Lots of Less Than 1,000 Pounds	II *Lots of 1,000 to 20,000 Pounds	III ‡Lots of 20,000 Pounds or More
Plant Scrap			
Segregated 2S clips or other 2S solids	10.00	11.00	11.50
Mixed clips or other mixed solids	8.50	9.50	10.00
Segregated borings and turnings	7.50	8.50	9.00
Mixed borings and turnings	6.50	7.50	8.00
Obsolete Scrap			
Pure cable	10.00	11.00	11.50
Old sheet and utensils	9.50	10.50	11.00
Old castings and forgings	10.00	10.50	11.00
Pistons free of struts	10.00	10.50	11.00
Pistons with struts	8.00	8.50	9.00

Segregated solid plant scrap other than 2S maximum prices are not established for solid plant scrap other than 2S which is segregated, identified, handled, sold, and delivered in accordance with supplementary order M-1-d or other instructions and regulations issued by OPM. Scrap of this description is not subject to the price schedule.

*If shipped by truck; or 1000 pounds to minimum carload, if shipped by rail.

‡If shipped by truck; or minimum carload if shipped by rail.

Maximum Prices for Secondary Aluminum Ingot

(F.o.b. Point of Shipment)

Grade of Secondary Aluminum Ingot:	Maximum Price (Cents per Pound) in Quantities of 30,000 Pounds or More
98 per cent pure aluminum ingot	15
Silicon alloys	15
Piston alloys	14½
No. 12 aluminum	14½
Deoxidizing aluminum, notch-bar granulated, or shot	13½
(2c. extra for special shapes)	

Quantity Differentials

The following premiums may be charged, in addition to the maximum prices of secondary ingot, where sales are in the quantities specified:

Quantity:	Premium (Cent per Pound)
10,000 to 30,000 pounds	¼
1,000 to 10,000 pounds	½
Less than 1,000 pounds	1

Formal Schedule on Lead

• • • **To stimulate** the production of common primary lead, OPA on Jan. 13 fixed a base maximum price of 6.50c. per pound, f.o.b. New York. Lead has been selling at 5.85c., New York, since March, 1941, under informal understandings with leading producers.

The price schedule (No. 69, effective Jan. 15) takes into consideration the customary differential between the four grades, common, corroding, chemical and copperized lead by fixing a maximum differential for corroding and chemical lead at ten points above common lead and a maximum premium of five points for copperized lead above the price of the grade from which it is produced. A "point" is one one-hundredth of a cent. In differentials for special shapes the maximum price is fixed at 50 points above the pig lead price of the equivalent grade.

As it has been customary for lead producers to sell carlots on a delivered basis, the schedule pro-

vides for the usual differentials between New York, St. Louis and other specified delivery points. The carlot delivered prices at such specified points are then made the basis for f.o.b. sales of less than carlots for which maximum premiums are stated.

Primary Lead in Carload Lots

Grade or Type	Maximum Price Per Pound (Delivered Buyer's Rail Receiving Point) St. Louis	New York	Other Points
Pigs			
Common lead	6.35¢	6.50¢	Base Price
Corroding lead...	6.45¢	6.60¢	Base plus .10¢
Chemical lead ...	6.45¢	6.60¢	Base plus .10¢
Copperized lead made from			
(a) Common lead.	6.40¢	6.55¢	Base plus .05¢
(b) Corroding lead	6.50¢	6.65¢	Base plus .15¢
Ingots, linked ingots, or other special shapes			
Common lead	6.85¢	7.00¢	Base plus .50¢
Corroding lead ..	6.95¢	7.10¢	Base plus .60¢
Chemical lead ...	6.95¢	7.10¢	Base plus .60¢
Copperized lead made from			
(a) Common lead.	6.90¢	7.05¢	Base plus .55¢
(b) Corroding lead	7.00¢	7.15¢	Base plus .65¢

LESS THAN CARLOADS

(1) Sales By Producers of Primary Lead

For Sales in Lots of:	Maximum Price per Lb. (F.o.b. Shipping Point) Carload Maximum Price Plus:
20,000 lb. and less than a carload	.15¢
10,000 lb. and less than 20,000 lb.	.25¢
2,000 lb. and less than 10,000 lb.	.40¢
Less than 2000 lb.	.50¢

(2) Sales By Distributors, Dealers, Jobbers and All Other Persons Except Producers and Plumbing Supply Houses

For Sales in Lots of:	Maximum Price per Lb. (F.o.b. Shipping Point) Carload Maximum Price Plus:
20,000 lb. and less than a carload	.65¢
10,000 lb. and less than 20,000 lb.	.75¢
2000 lb. and less than 10,000 lb.	1.00¢
Less than 2000 lb.	1.50¢

The new price schedule applies to all buyers and sellers of primary lead producers, distributers, jobbers, dealers and plumbing supply houses.

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Scrap Lead Prices

• • • **Simultaneously with** the new price schedule on primary lead, OPA announced a schedule (No. 70, effective Jan. 15) of ceiling prices on lead scrap, secondary lead, including calking lead, battery lead scrap and antimonial lead, both primary and secondary. The maximum prices for all these grades are keyed directly to the newly established price of 6.50c. per lb. for common primary lead.

The maximum prices per pound, f.o.b. point of shipment for clean scrap are as follows:

	Base Price Less
Soft lead scrap	0.55¢
Hard lead scrap	0.55¢
Battery lugs	0.65¢
Lead content of lead-covered copper cable	0.65¢
Cable lead scrap	0.55¢

Note—Lead scrap may be sold at a price delivered buyer's receiving point. In such cases whenever the total delivered price exceeds the maximum f.o.b. point of shipment price, the transportation charge must be shown as a separate item, and the price f.o.b. point of shipment less transportation charge from total delivered price must not exceed maximum f.o.b. shipping point price set in the schedule.

The ceiling price of these materials effective in each community is determined by finding in Appendix F of the price schedule the base price established for the community. The deductions established in the schedule are then subtracted from the effective base price to arrive at the maximum price f.o.b. point of shipment.

Maximum base prices for secondary lead (including calking lead) sold in carload lots are:

Low grade secondary pig lead (with less than 99.73 per cent lead) base price less .15c.; low grade secondary lead ingots, linked ingots and other special shapes (containing less than 99.73 per cent lead) base price plus .10c.; high grade secondary pig lead (certified to contain not less than 99.73 per cent lead) base price; high grade secondary lead ingots, linked ingots and other special shapes (certified to contain not less than 99.73 per cent lead) base price plus .50c.



PRICES CHIEF ON WHEELS: Leon Henderson, price administrator, took a spin on a new "victory model" bicycle last week, with a government stenographer as ballast.

↓ ↓

Assures $16 Sulphur Price

• • • **The Freeport Sulphur Co.** has voluntarily offered to continue selling its product through 1942 at the 1941 base price of $16 per ton, f.o.b. mines, OPA announced Jan. 19. Leon Henderson expressed confidence other companies would set similar price policies on sulphur.

↓ ↓

Washer Price Stabilization

• • • **OPA on Jan 16** requested manufacturers of plain wrought washers to refrain from increasing prices beyond levels existing in their companies on Dec. 1, 1941. Filing of existing price schedules with OPA also was asked.

Other Voluntary Actions—

Manufacturers of metallic lead products and lead pigments were asked not to make any sales at prices above those in effect as of Jan. 2 in telegrams sent out Jan. 13 by Price Administrator Henderson.

Price increases in original equipment tires for farm machinery, established by the "Big Four" tire makers as of Jan. 1 were voluntarily rescinded Jan. 15 following a request by OPA.

Retail coal dealers were asked by OPA Jan. 17 to stabilize prices at levels prevailing Dec. 15 to Dec. 31, 1941.

Other Amendments—

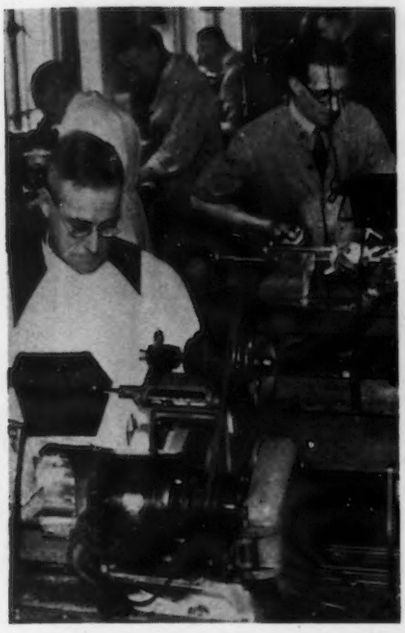
Schedule No. 40, Builders' Hardware—steel insect screen cloth removed from the schedule. Covered in Schedules 6 and 49. The amendment leaves in Schedule No. 40 commercial bronze, hand drawn copper, and "kool-shade" fabric insect screening. Other minor changes made by the order include an expansion of "door bells" to cover "door bell plates and push buttons, and an elimination from the miscellaneous hardware group of screw hooks and eyes."

Schedule No. 21, Formaldehyde—certain exemptions are withdrawn; all users are put on same basis; charge for containers is allowable when formaldehyde is shipped in carboys or drums. The amendment also provides a method of determining prices for solutions of other content than 37 per cent by weight.

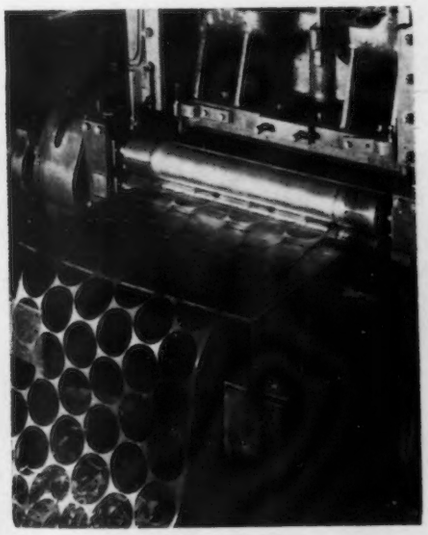
Schedule No. 30, Wastepaper sold east of Rocky Mountains—"Old Kraft corrugated containers" abolished as a separate grade in the schedule.

Schedule No. 61—OPA announced Jan. 16 that all tanners of leather had been asked to file detailed information on production, sales and prices so that inequities under the price schedule can be adjusted with individual lists of maximum prices for each tanner.

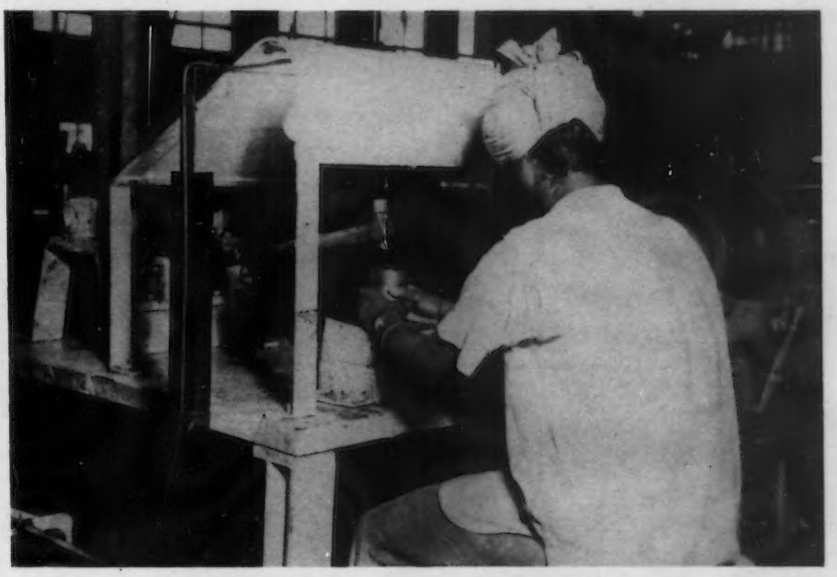
Schedule No. 58—Specific maximum prices for several grades of wool tops and yarns used in making Army clothing are established in an amendment to this schedule, announced Jan. 17.



MACHINISTS OVER 50: A total of 350 skilled craftsmen whose average age is above 50 are employed by 38 London companies. Each company has a munitions shop in its own workshop and these men take over the operation of the machines when contracts are available, returning to their normal hand craftsmanship only when lack of war orders shut down their machines. The work is voluntary and this shop is that of a silversmith.



"COOKIE" PRESSES: With 65 per cent of its present production absorbed by defense activities, the Westinghouse small motor plant at Lima, Ohio, is expanding its output by improved methods, rearrangement of manufacturing facilities and 20 per cent increase in floor space. The photo shows one of a battery of "cookie" silicon steel disks automatically dropping into a gravity chute that delivers them to an inclined power conveyor whence they are carried to a stacker, presses that stamp out 50,000 rotor or stator laminations per hour.







INDUSTRY TO INDIA: India is quickly tooling up with modern machinery to make large supplies of armaments and fighting equipment for its expanding army. These photos show the manufacturing of shells, castings, and welded gun firing platforms.

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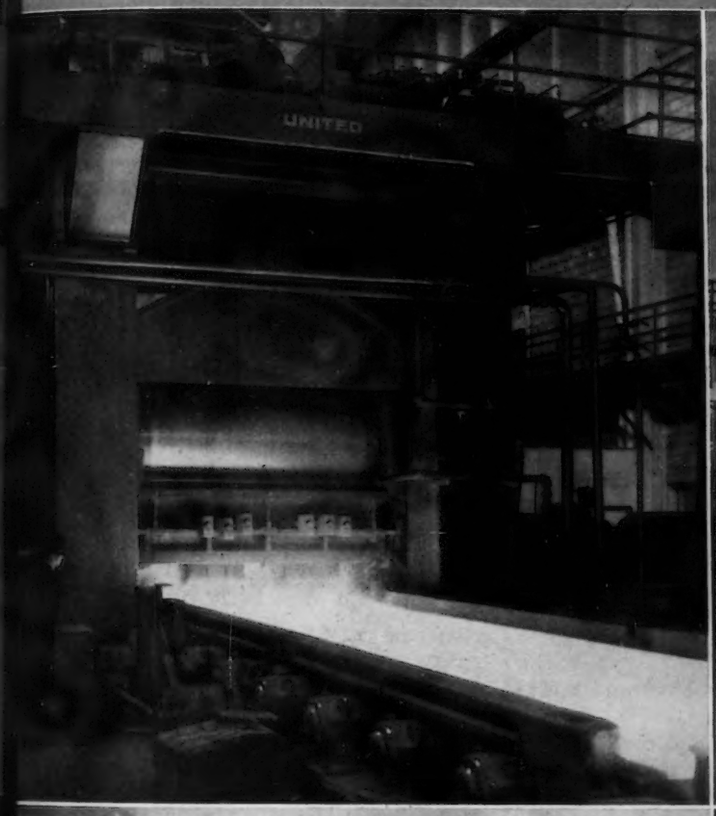




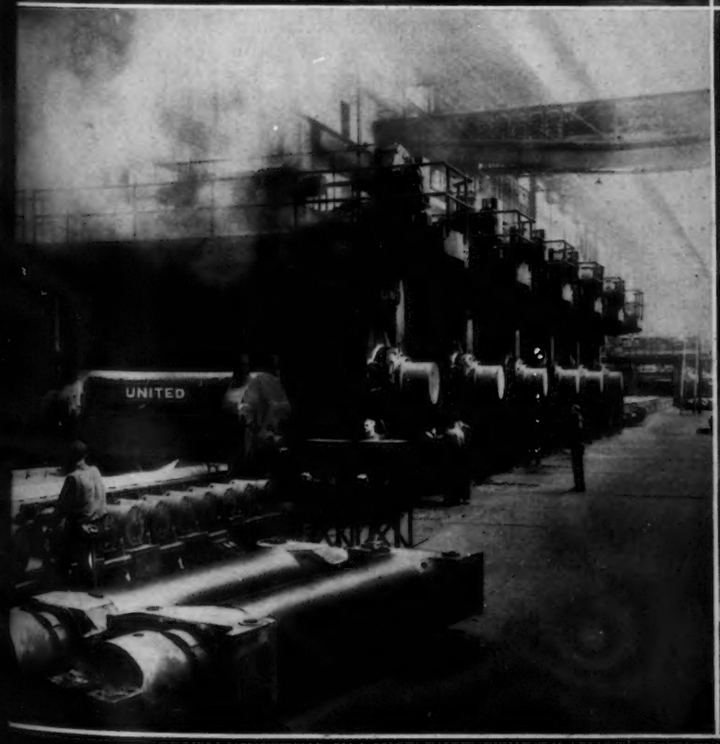
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OUR GREATEST NEED NOW IS TO PRODUCE

Unless the iron and steel industry can continue to maintain maximum output, our industrial war program will not move fast enough to bring Victory speedily.

The iron and steel industry's greatest need is more and more scrap.

Every reader of The Iron Age can help—

1. Search your plant and yards for every bit of available scrap, no matter how small the quantity.
2. Ship it to market at once through your dealer or broker.
3. Encourage your local organizations—Chamber of Commerce, Salvation Army, Boy Scouts and City refuse collectors—to scour the byways and highways for scrap of all kinds.
4. Enlist the aid of your local newspapers and radio stations by showing them the importance of supporting the OPM's National scrap collecting campaign.

For further information consult your local dealer or write to the OPM, in Washington, or to—

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Massachusetts Plants On All-Out War Schedule

Boston

• • • **With its armory,** arsenal, shipyards, machine tool and electric appliances manufacturers, metal working plants and foundries, textile and shoe makers, to say nothing of small private shops with munition sub-contracts producing six and in some instances seven days a week, Massachusetts apparently is on as near an all-out war schedule as is possible. Some authorities estimate 75 per cent of every town's and city's manufacturing capacity is working either directly or indirectly for the government.

Not a strike in a defense plant is reported, but about a dozen, involving approximately 300,000 workers, have been averted so far this month.

On the other hand, thousands have lost regular employment in the state since Jan. 1 through lack of essential manufacturing materials, and additional thousands will be laid off before March 1. Of those thrown out of work, some 80 per cent were employed in the manufacture of rubber and metal products.

As yet, few skilled metal workers are on the labor market, but many a small employer will be obliged to let such workers go before long. Losses in used labor capacity, as stated, will in part be partly offset by rehiring elsewhere.

Another indication of further layoffs even in vital plants is the stand Washington has had to take regarding automobile tires. Thousands upon thousands of skilled workers in shipyards, explosive making plants, Connecticut airplane manufacturing establishments, arsenals and armory travel miles each day to and from work.

To illustrate, workers in the Fore River, Bethlehem Steel Co. Quincy yards go and come from work each day as far as New Bedford and Fall River to the south and northern and middle Massachusetts and nearby New Hampshire and Maine points.

Massachusetts public transportation systems are not equipped to handle transportation of such workers, and a question is—what will transpire when worker's automobile tires are beyond repair.

Conservation Plan for Mechanics Announced

• • • **A "Conservation Control** Plan," making use of instruction cards for the guidance of mechanics in the correct use of tools, and publicized by posters and buttons, has been announced by Henry Disston & Sons, Inc., of Philadelphia.

By means of the control cards the individual worker is told how to handle a particular tool, how to keep it from breaking, how to sharpen it, and other important information. There are 35 of these cards, covering cutting tools for metal, wood, plastics, etc., including tool bits, files, hack saw blades, carboloy knives and cutters, circular metal and wood cutting saws, band saws for wood or metal, planer knives, etc. The cards are supplied free by Disston to any plant, along with buttons bearing a seal and the slogan "Conservation Serves Everyone."

Union Men Will Stay on Job

Chicago

• • • **A voluntary pledge** to refrain from any production stoppage has been given Acme Steel Co. here by the International Association of Machinists, Local 1129, an affiliate of the American Federation of Labor. The local is the only organization possessing a bargaining agreement with the firm, and appears to be the only trade union in this area to promulgate such a pledge.

Coming Events

Jan. 16 to 25—International Aviation Show, Convention Hall, Detroit.

Jan. 26 to 29—American Society of Heating and Ventilating Engineers, annual meeting and exposition. Bellevue-Stratford Hotel, Philadelphia.

Jan. 26 to 30—American Institute of Electrical Engineers, annual winter convention, Engineering Societies Bldg., New York.

Feb. 9 to 12—American Institute of Mining & Metallurgical Engineers, Waldorf-Astoria Hotel, New York.

March 4—American Society for Testing Materials, Cleveland.

May 25 to 28—National Association of Purchasing Agents, Waldorf-Astoria Hotel, New York.

U. S. Iron Ore Output 92,499,000 Tons in 1941

Washington

• • • **Estimated at** 92,499,000 gross tons by the Bureau of Mines, the 1941 production of iron ore set an all-time record, exceeding by 23 per cent the previous record made in 1917, and topping the 1940 output by 20 per cent. Ores shipped from mines last year totaled 92,684,000 tons valued at $230,593,000, which represents an increase of 23 per cent in quantity and 22 per cent in total value compared with 1940. The average value of the ore at mines in 1941 was estimated at $2.49 per ton compared with $2.51 in 1940.

About 86 per cent of the iron ore shipped in 1941 came from the Lake Superior district where production was 79,130,000 tons, an increase of 29 per cent over the previous year. Output of iron ore in the Southeastern states, in which the Birmingham district is the largest iron ore producing area, approximated 7,951,000 tons in 1941, an increase of 7 per cent over 1940. The Northeastern states, which include the Adirondack district (New York) and the Cornwall district (Pennsylvania), mined 3,975,000 tons of iron ore in 1941, an increase of 12 per cent over 1940. In 1941 California, Missouri, Nevada, Oklahoma, South Dakota, Texas, Utah, Washington, and Wyoming produced 1,443,000 tons.

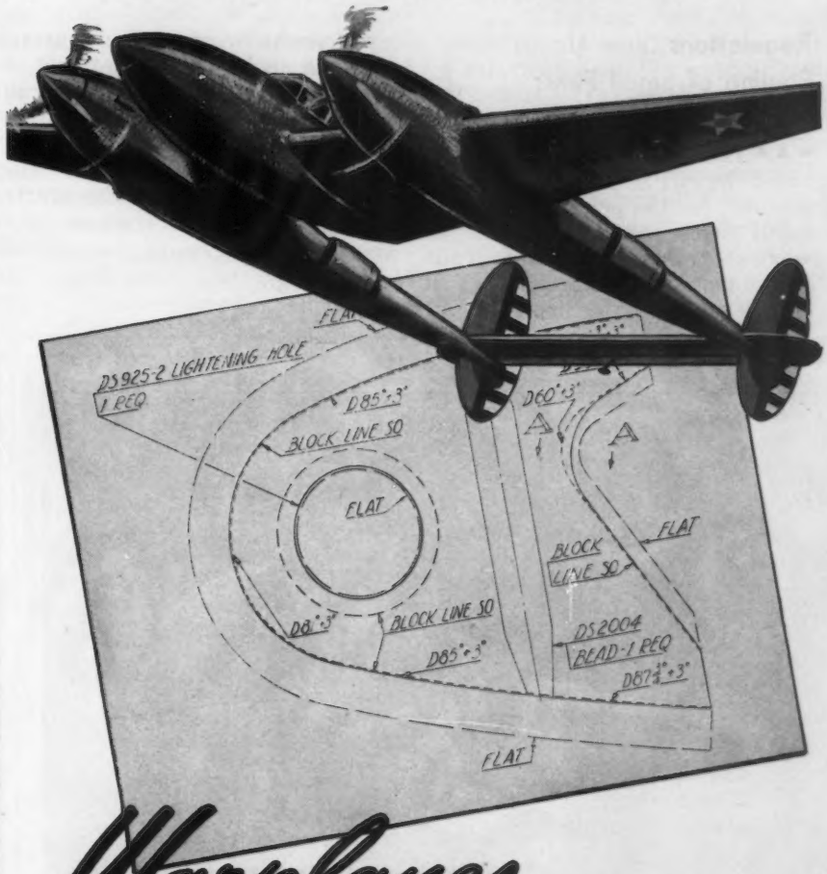
The imports of iron ore reported for the nine months ended September 30, 1941, were 1,707,811 tons valued at $3,917,452, compared with 2,479,326 tons valued at $6,204,641 for the entire year 1940.

War Orders Recommended

La Crosse, Wis.

• • • **OPM has recommended** placing of war orders here amounting to 800,000 man hours of work to ease unemployment. Out of a 5800 working population, about 1500 have already been laid off in the community which is essentially an agricultural area. OPM Labor Division, after a study of the area, contended that 81 per cent of the city's workers are employed by six manufacturers, whose work will be curtailed because of war.

TO KEY MEN: Can You Use Sheet Metal Working Data for Defense Products—and Post-War Plans?



Warplanes...

from Printed "Cut-Outs"!

Draw-by-hand days are gone for draftsmen in most of America's giant warplane plants. Work templates that once required days and even weeks of a designer's time now are reproduced in a few minutes!

Only a "master" pattern is needed. In many plants ARMCO Galvanized PAINTGRIP sheets are used for these master drawings. After a special coat of paint is applied to the PAINTGRIP sheet an original full-scale design is drawn by hand. Exact transfers to the aircraft metal are made in a few minutes either by electrolytic or photo processes. (Names of patent holders will be supplied on request.)

ARMCO PAINTGRIP is used for master templates because it is smooth, flat and easy to work. Extra wide sheets are available. PAINTGRIP *takes and holds paint* and does not smudge. Moreover the paint does not peel or flake.

The result: Aircraft companies save valuable time and money—boost the mass production of warplanes for victory-bound America.

Write us if you can use fabricating information on ARMCO Galvanized PAINTGRIP sheets for war uses or for products you will make when peace comes. The American Rolling Mill Co., 461 Curtis St., Middletown, O.

A LABEL KNOWN TO MILLIONS

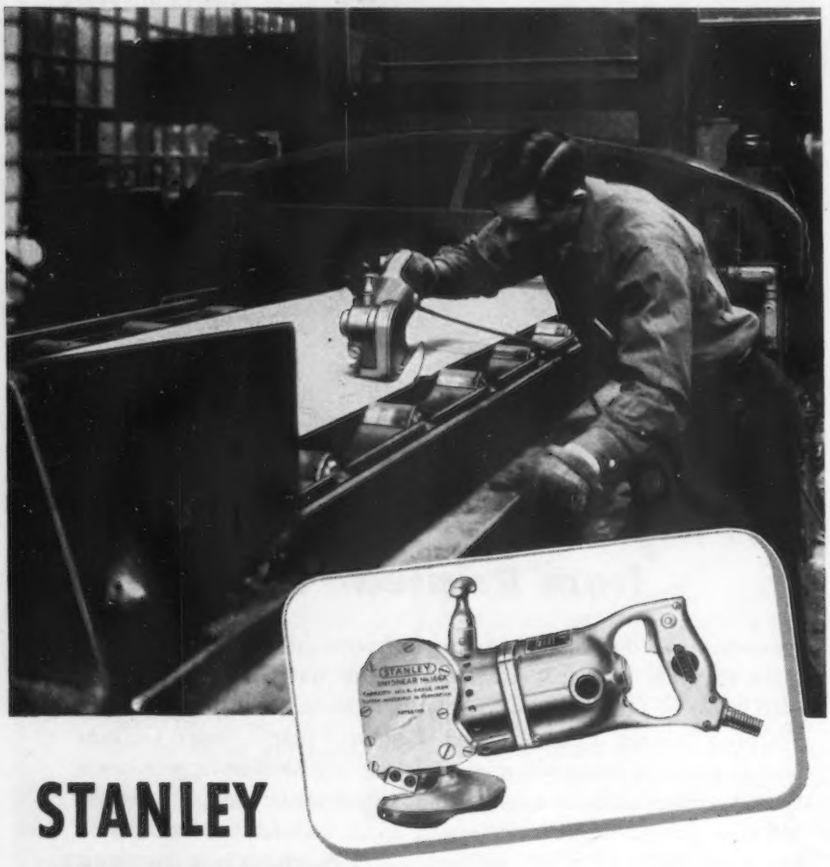
GALVANIZED ★ INGOT IRON PAINTGRIP ★ ARMCO

Regulations Slow Up Pooling of Small Firms

Chicago

• • • **This city,** having been designated by OPM as the "proving ground" for the pooling system of small firms bidding together on war contracts, finds its plans halted temporarily until the armed services are granted more liberal policies in closing war contracts on the spot. This factor and the failure to obtain the "bits and pieces" exhibit which was to have been erected permanently here have been responsible for the delay. Alex Taub, of OPM, who drafted the plan here, said work would be resumed as soon as federal officials could take time from "the immediate needs of war."

Chicago has already been divided into seven districts in a campaign to organize manufacturers employing between 200 and 1000 people. Taub's plan involved building small pools around work pieces included in the permanent exhibit. When the exhibit is established here, the success of the plan locally will determine whether it will be used by OPM on a national scale.



STANLEY UNISHEARS *for fast metal cutting*

You can cut sheet metal anywhere in the plant, and cut it *fast*—up to 15 feet per minute, as you feed—with a portable Stanley Unishear. Above illustration shows No. 144A Unishear being used in modern steel mill to trim tough edges of steel strip, a job where fast cutting is essential. The No. 144A Unishear cuts up to 12 gauge hot rolled steel or galvanized iron, softer materials in proportion.

Four portable Unishears with capacities of 12 - 14 - 16 - 18 gauge steel. Five stationary models with capacities of 14 and 10 gauge steel. All are widely used for regular production of sheet metal parts when quantities do not warrant making expensive dies.

Ask for a demonstration by your Stanley distributor. Or, write for a Catalog describing the full line of Stanley Electric Tools. Stanley Electric Tool Division, The Stanley Works, 173 Elm Street, New Britain, Connecticut.

STANLEY
Electric Tools
A Complete Line For Industry

Chromium Melted Only For A-1-J Rating or Higher

New York

• • • **While they are** still accepting new orders for chromium steels having a preference rating of A-10 or better, some Eastern steel producers are unable to make any delivery promises on such new orders unless the preference rating is A-1-j or better. OPM ordered the restriction on actual melting, "for the remainder of January and until further notice."

There are three exceptions to the above restriction on melting; namely, for tool and high speed steel; bearing steel for bearing manufacturers, and steel for the manufacture of welding rods. These exemptions grant the right to continue melting any chromium steel the order for which is covered by a preference rating of A-10 or higher. It is expected that some definite OPM order in the form of a new general preference order or an amendment to the existing General Preference Order M-21 will make these exemptions official for the months following January.

Republic Building 1 Blast And 6 Electric Furnaces

Cleveland

• • • **Republic Steel Corp.** broke ground Jan. 13 at its Chicago plant for the installation of six electric furnaces, each having a capacity of 70 tons. The annual capacity of the furnaces will be about 500,000 tons.

Contracts have been let to the Standard Boiler & Plate Iron Co., Niles, Ohio, for the construction of a 1100-ton blast furnace at Republic's Youngstown plant.

Nazi Resources Listed by Expert

Washington

• • • **Germany is assured** ample supplies of lead, zinc, and mercury for essential needs, and now controls enormous resources of iron ore, manganese, and coal capable of supporting an iron and steel industry that can compete with that of Great Britain and the United States, says a report prepared by Charles Will Wright, foreign minerals specialist, Bureau of Mines.

Blast furnaces now within the German sphere of domination, the report said, produced 44 per cent of the world's pig iron in 1940 and the Axis is diverting a larger proportion of its steel to military needs than are the democracies. Germany also has available, Mr. Wright pointed out, large reserves of regimented labor and if she is successful in controlling the areas now occupied and in reorganizing industry and transportation to meet military requirements, she should be able to wage war effectively for some time.

Agreeing that because of the United States' great mineral resources and plant facilities it is only a matter of time when with Great Britain the democracies will have control of the air and sea, Mr. Wright, nevertheless, warns that the new Germany already is a powerful adversary working at maximum capacity in the output of airplanes, submarines, tanks and munitions.

"Just when the United States and Great Britain will be in position to exceed the German production of these war machines depends largely on their ability to increase and maintain mineral production and the extent to which civilian consumption is curtailed to permit more rapid advances in the manufacture of required war materials," the report said.

In the case of aluminum and magnesium, the metals so essential to the manufacture of airplanes and incendiary bombs, Mr. Wright said that Germany was out-producing the United States, Great Britain and Canada up to 1941. By the end of 1941, it was expected that the combined aluminum output of the three allied countries would pull ahead of German-dominated nations and that the Allies' 1941 figures would be nearly doubled by the end of 1942. In the case of magnesium, the report stated, it is believed American and British output is now equal to German production, while American output alone by 1943 will be more than four times Germany's.

"Germany lacks copper, tin, tungsten, nickel and petroleum but these deficiencies have been made up in part by substitution, reclamation, stockpiling, and increased production mostly from submarginal deposits," the report said. "There is no immediate prospect of a collapse of the military machine because of shortages of any of these minerals. German possession of the Near Eastern oil fields, would assure ample petroleum for all essential needs if transport and reconstruction problems were solved."

Trouble Getting Chlorinated Solvents?

Here's a better and Cheaper Method for Metal Degreasing!

The Magnus Emulso-Dip or Emulso-Spray method of cleaning metal parts solves the problem completely:

- **It replaces solvent or vapor degreasing.**
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- **Handles smut and difficult dirts not readily removed by other methods.**
- **Can be used without heat on many operations.**
- **Is applicable to *all* types of metal cleaning.**
- **Has been successfully used for months in many defense plants.**

MAGNUS EMULSO-DIP

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MAGNUS EMULSO-SPRAY

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Adaptable in many cases to existing washing machines.

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Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

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Music Wire: Bright, Cadmium Plated, Tinned

Hand Drawn Spring Wire and Basic or Bessemer Wire: Bright, Tinned, Coppered, Galvanized, Cadmium Plated

Oil Tempered Wire . . . . . Black
Stainless Steel . . . . . Natural
Brass . . . . . Natural
Phosphor Bronze . . . . . Natural

For rust resistant finishes we suggest the following for round or flat materials

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Nickel: over Copper and Buffed, Buffed, Burnished, Dull, Black

Cadmium . . . . . Bright
Galvanized . . . . . Chrome Plated Dull
Brass Plated . . . . . Black Oxidized
Copper Plated . . . . . Statuary Bronze

Bring your questions about finishes to Dunbar for advice and consultation.

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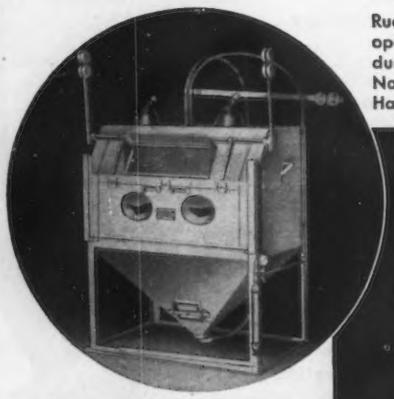
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Ruemelin Sand Blast Cabinets put blast cleaning operations on a faster, more efficient basis. Eliminate dust, permitting installation anywhere in the plant. No skilled labor required. Sturdily constructed. Handles sand or steel abrasives. Prompt delivery.



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RUEMELIN Blast Cleaning Cabinets

Labor Rates Curb Dismantling Job

Cleveland

• • • **The problem** of salvaging certain old structures will not be solved easily in certain areas where union labor insists that union structural workers be employed to do the necessary dismantling work.

An outstanding example of this is the quiet collapse of plans to tearing down a viaduct here, when it was learned that its dismantling by union labor would cost close to $60,000 for about 2500 tons of potential scrap, taking into consideration further preparation and loading on freight cars. Local dealers could do this work more cheaply, provided that the union problem could be overcome. However, the probable upshot of all such situations appears to be that such salvage work will not be done when the high labor cost involved is realized, as in the case of the viaduct here. This is one serious problem that dealers hope the OPA will solve, if such potential scrap is to be recovered.

Committee Picked in Cincinnati Scrap Drive

Cincinnati

• • • **A local campaign** to conserve and gather waste materials in the interest of defense was inaugurated last week. A six man committee has been appointed. Paul Christensen and Fred Schoeffler represent the National Metal Trades Association; W. L. McGrath and D. J. O'Connor, the Cincinnati Industrial Association and A. J. Oberhelman and G. A. Seyler, the Associated Foundries of Cincinnati. Plans call for designation of one man in each plant to supervise conversion of obsolete equipment into scrap.

$2 Billion in Orders Sighted

Cleveland

• • • **Lt. Col. H. M. Reedall,** deputy chief of the Cleveland Ordnance District, predicted that almost $2,000,000,000 of war orders will be placed with concerns in this district this year, exclusive of the $900,000,000 in war orders now being worked on.

Claims Scrap Sales by City Exceed Ceiling

Cleveland

• • • A protest to OPA has been made by A. Soltz, president, Marquette Steel Co., over the sale of 92 tons of cast scrap to a foundry by the City of Cleveland at prices which he claimed were from $1.89 to $2.27 above the ceilings. He added that the city had offered this scrap for sale about two months earlier, but on finding that all bids were within the legitimate OPA limits had returned the bids and later readvertised the scrap again for sale.

Local scrap dealers observe that if the OPA forces Cleveland to return the excess over the ceiling price to the foundry after the scrap involved has been melted the foundry will have successfully scored a coup that would go unpunished.

Sympathy Strike Called At Cleveland Plant

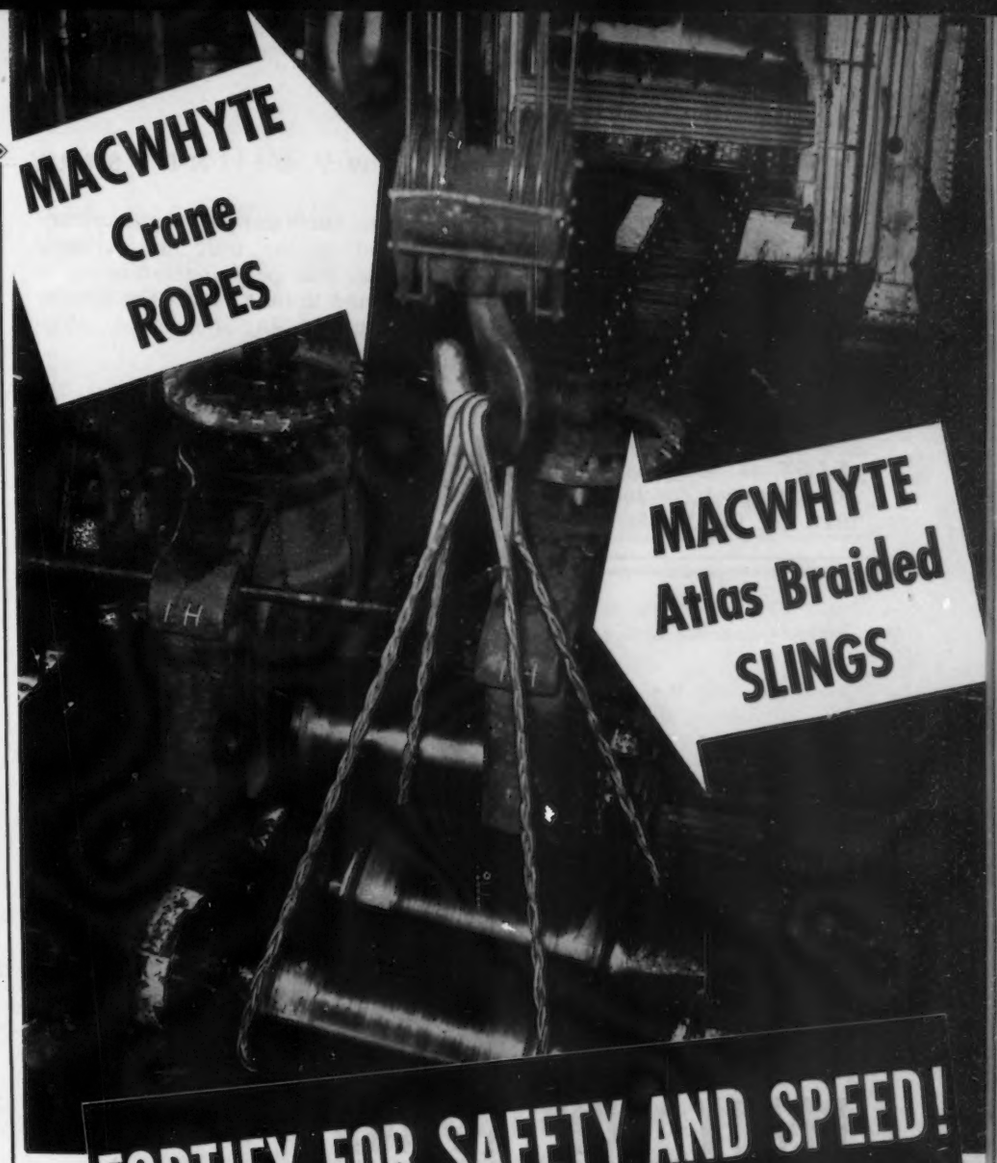
Cleveland

• • • **The production war** against the Japs and Nazis was halted for 2½ hours by 100 workers at the National Bronze & Aluminum Co., when they walked out in sympathy with two men involved in wage altercations. The strikers were persuaded to return to work, pending settlement of the dispute.

Plans to Produce Family Shelters

Cleveland

• • • **The Broden** Construction Co., subsidiary of Wean Engineering, Inc., plans to start mass production of family size air raid shelters to be built with steel plates 3/16 in. thick. The Broden air raid shelter is 10 ft. long and 8 ft. wide, can accommodate about 10 persons, and may be turned out by the company at the rate of 15 units a day.



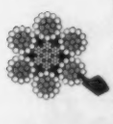
FORTIFY FOR SAFETY AND SPEED!

No rest for Wire Rope—is the story today. Men work in shifts but Crane Ropes work ALL shifts. They're on the job 24 hours a day and in many plants 7 days a week.

You need the best rope with the highest strength, wear resistance, and fatigue resistance . . . all essential to speed and safety. You can get such a rope in the correct size and construction for your cranes—Buy **Monarch Whyte Strand PREformed Crane Rope.** Tell us the make, model, and capacity of your crane and we'll give you the correct rope for it.



Outer wires in each strand are Monarch Whyte Strand PREformed's first line of defense. They have maximum tensile strength, great abrasion resistance.



Inner wires in each strand are the reserve strength of the rope. They are specially drawn with maximum flexibility and toughness for inside service.

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Your slings must grip the load FIRMLY, permit SPEED in lifting and carrying the load. Macwhyte manufactures such slings: **Macwhyte Atlas Braided Slings.** Today they're being used to handle pipes, bars, shapes, armament, machinery, rolls, etc. The braided body of Macwhyte Atlas Slings, made from two endless wire ropes, is braided in a uniform balanced spiral. This not only provides for SAFE load handling . . . but also makes Atlas slings extremely flexible. They're easy to handle, save much handling time.

Send on your company letterhead for helpful rigging bulletins.

CRANE ROPES with extra stamina to hoist your loads . . . BRAIDED SLINGS to harness it safely. *BUY BOTH FROM*

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West Coast

[CONTINUED FROM PAGE 64]

is laid, instead, on the number of hours per week. Failure to recognize this principle has been one of the grains of irritation in putting into effect around the-clock work seven days a week.

JUST as the master shipyards agreement concluded April 23, 1941, for the Pacific Coast was a model for later agreements concluded on the Gulf and Atlantic Coasts, this new understanding is expected to be a model for similar agreements in the other shipbuilding territories.

Even though the two San Francisco Bay machinists' unions which have proved most recalcitrant in the past did not join the agreement, ability of the AFL unions signatory to the pact to exert pressure on other workers has now been so thoroughly demonstrated that any attempt to buck the new agreement is unlikely. More than that, it is eminently fair working outline.

Any thought that the peak of demand for reinforcing steel for military projects in the Pacific Coast territory has been reached should be discouraged. Bid dates for reinforcing steel for public projects, such as Bureau of Reclamation, dams and power houses, now regularly come and go without any bids being received. The sole loosening tendency has been more frequent offering of bids for Eastern mills such as Inland, Carnegie-Illinois, and Sheffield. Ability of these mills to fill Coast requirements as well as those of their own territories is, of course, limited. Failure of Coast mills to meet reinforcing bar demand is no mere matter of priority.

Current indications are that even direct allocations, which have been imposed for several months now, will soon fail to provide reinforcing steel. A possible clue to a means of partially easing the situation might be found in the use by some contractors on small jobs of hot rolled round merchant bars for such concrete reinforcement as walls and driveways. Merchant bars continue to be available for a base price of $2.80 per one hundred pounds, while no reinforcing bars are to be had for $2.55 per hundred pounds. The Pacific Coast is the only section of the country in which this condition exists. The differential had its origin in cutthroat competition of pre-boom days when direct mill selling of reinforcing steel dislocated the market. Merchant bars, sold through distributors, remained stable in comparison. Freezing of this unnatural price differential to some extent may account for lack of reinforcing steel supply now.

Rather than use strongarm methods to force rolling of reinforcing steel, it would no doubt be far more effective to bring the reinforcing steel price to a level with merchant bars, thus providing incentive to the mills.

Cost to the government of such a step would be extremely nominal. For instance, on a large storehouse building requiring 1000 tons of reinforcing steel, additional cost would be only $4000.



READY FOR ACTION!

• Fast working manufacturers of war materials are finding Wyandotte Special Metal Cleaners ready for action on every cleaning front. One of these Cleaners, for example, is tops for cleaning brass cartridge cases in all sizes after drawing and machining.

• There are countless other uses for the Wyandotte line—cleaning steel projectiles . . . bomb bodies and fins . . . fuses . . . airplane motor parts . . . pistons, crankshafts, camshafts . . . aluminum, magnesium, or their alloys . . . and many, many more—a Wyandotte Cleaner for every metal-cleaning problem, and for use in all kinds of cleaning equipment. Have your local Wyandotte Service Representative call today. No obligation.

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THE J. B. FORD SALES COMPANY, WYANDOTTE, MICHIGAN

Fieger, Retired J. & L. Executive, Dies at Home

• • • **Frederick E. Fieger,** retired executive of Jones & Laughlin Steel Corp., died Jan. 16 at his home in Edgeworth, suburb of Pittsburgh.

Mr. Fieger, a native of Pittsburgh, started his career in 1901 with the American Sheet & Tin Plate Co. In 1911 he became affiliated with the Whitaker-Glassner Co. as chief engineer. He left the Whitaker-Glassner Co. in 1917 to join the Jones & Laughlin company, with whom he was associated in various executive capacities until 1937 when he retired.

Cleveland Exhibit Hall Will Be Huge Machine Shop

Cleveland

• • • **The municipal** underground exhibition hall, containing about 165,000 sq. ft. of space, with a ceiling ranging in height from 20 to 30 ft., has been turned over to the Federal Government without cost by Mayor Frank J. Lausche of Cleveland, to be used for putting a large number of small machine shops under one roof and making them one large establishment. The offer has been accepted by Lieut. Col. H. M. Reedall, Deputy District Chief of Ordnance and is subject to approval by City Council. Colonel Reedall stated that various small and remote plants which might be forced into idleness, due to their economic handicaps, could be harnessed to the war effort by transferring their equipment and personnel to the gigantic Public Hall. Moreover, this will permit a reduction in the number of instructors and inspectors now scattered over large areas in many small plants. If the plan works out successfully it may be adopted by many other cities who own large auditoriums or similar structures.

Workers Aided on Taxes

Cleveland

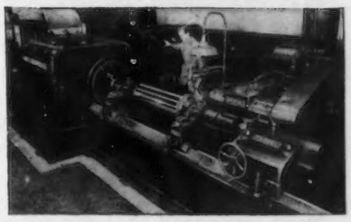
• • • **To prevent** defense workers from losing too much time in settling their Federal income tax, field agents from the Department of Internal Revenue will visit various war plants. In this area, nine field men have been helping workers at Warner & Swasey Co. and the Ohio Forge Co. to fill out their income tax blanks.

Technical Societies Aid OPM on Specifications

Washington

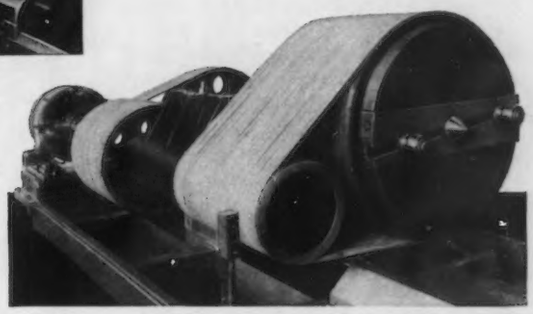
• • • **The American Iron** and Steel Institute, Society of Automotive Engineers and American Society of Testing Materials have set up a central committee together with about 15 sub-committees to advise OPM on standards and specifications in collaboration with the Army and Navy.

The sub-committees are now meeting to determine how the wide range of standards now in use can be reduced in number, and will submit their recommendations to the main committee who will pass the information along to OPM. Army and Navy officials will meet with the committee to determine the final policy to be followed.



Left—One of six Farrel 36" x 16'0" Heavy Duty Roll Grinders installed in strip mill.

Below—Multiple V-Belt Headstock Drive for 60" Roll Grinder.



SMOOTHER FINER ROLL FINISH OBTAINED

by the* VIBRATIONLESS MULTIPLE V-BELT HEADSTOCK DRIVE *of

FARREL ROLL GRINDERS

The multiple V-belt headstock drive of the Farrel Heavy Duty Roll Grinder produces results in finer roll finish and increased output that formerly had been thought unattainable on any roll grinder. Its smoothness of operation and freedom from vibrations contribute materially to the rapid grinding of perfect surfaces free from all marks.

The Farrel headstock is a self-contained, compact, rugged unit which will give many years of trouble-free service with a minimum of attention and upkeep. Note these features: (1) Headstock mounted on same level and in line with grinder beds—no special pit required. (2) Number of belts is ample to rotate any roll within the capacity of the grinder. (3) Belt sheaves and large faceplate pulley mounted on precision type, anti-friction bearings. (4) Each reduction separately adjustable to give proper belt tension without the use of idler pulleys.

Farrel Heavy Duty Roll Grinders have many other important features which contribute to superior performance, better finish and increased output. For complete details write for a copy of Bulletin No. 111.

FARREL

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Auto Industry Will Map Specific Plans

Detroit

• • • **Top executives** of the automobile industry will meet Saturday, Jan. 24, with representatives of 1400 automotive concerns, including suppliers, to present specific plans for expediting the output of armament by the industry, including the $3,500,000,000 worth of military supplies ordered since the Japanese attack on Pearl Harbor, Dec. 7.

The occasion will be the first general meeting of the Automotive Council for War Production. It will be staged at 9.30 a. m. Saturday, in Masonic Temple Auditorium, Detroit. A general session in the morning will be followed by a series of afternoon meetings in which smaller groups will formulate plans for speeding up the production of tanks, airplane engines, bomber airframes, guns, marine equipment and other war products.

(See "Assembly Line" in this issue for outline of another method of accelerating military production in automotive plants.)

Meanwhile, the industry has moved rapidly to mobilize its machine tool resources for war production. The entire industry has been called upon to list all tools and equipment not actually at work on existing war contracts. Equipment not specifically needed for the industry's war work will be made available for other military production, even armament producers outside the auto industry. A complete and continuing inventory of idle machine tools and other manufacturing equipment will be filed with the used machinery division of OPM, to give it the broadest possible distribution throughout American industry.

Even equipment earmarked for war production, but not immediately required, is to be listed. Accompanying the list will be a report on the length of time such equipment is expected to remain available.

The listing will include special purpose equipment such as heat treating facilities.

This service is being carried out by an organization known as the machine tool and equipment listing service, established by the Automotive Council for War Production.

Railroad Industry Agrees to Schedule On Car Production

Washington

• • • **Assurance has been given** by the railroad industry to OPM that the railroads will meet SPAB's schedule providing for the production of 36,000 freight cars by May 1. This announcement was made on Tuesday, Jan. 20, following a meeting on the day previous of the railroad industry advisory committee with Andrew Stevenson, chief of OPM's Transportation and Farm Equipment Branch. In addition to the cars to be built, the program calls for the continued production of 926 locomotives and for all types of repair and equipment maintenance material.

It is estimated that the schedule will require 1,413,893 tons of steel, 353,636 tons of cast iron and 19,985 tons of non-ferrous metals.

It was agreed as part of the speed-up program to standardize construction of freight cars, using throughout the industry the specifications established by the Association of American Railroads.

The committee asked Mr. Stevenson and other OPM officials to re-survey the railroad industry's needs for steel castings as compared with war program needs in the hope that assurance can be given that this vital material will continue to be available.

The committee also discussed requirements for passenger service in the light of increased military traffic.

New Price Request On Lead Products

Washington

• • • **Price Administrator** Henderson on Tuesday, Jan. 20, sent telegrams to 77 producers of lead metallic products asking them not to exceed prices of April 1, 1941, plus .65c. per lb. of lead content. The request was a modification of an earlier one not to exceed Jan. 2, 1942, prices. If products now made were not priced on April 1 of last year, approval of OPA must be obtained for any price exceeding that in effect on Jan. 1. On the latter date the price of primary lead was advanced 65 points to 6.50c. a lb., New York.

Intensive Drive for Scrap Will Be Made

Washington

• • • **OPM is about to** initiate an intense campaign for the recovery of iron and steel scrap in an effort to build up depleted supplies, it was learned here Tuesday, Jan. 20. Outstanding feature of the program provides for the requisitioning and wrecking of old cars now on dump piles throughout the nation. Moreover, it was reported that if necessary, action will be taken looking to the requisitioning of old cars now in the hands of dealers.

The country will be scoured also to recover agricultural scrap from farms. Gathering of railroad old material will be expedited. Abandoned railroad and street car lines will be taken up to accumulate supplies for steel works and foundries.

It is estimated that about 3,500,000 tons will be obtained from the automobile scrapping campaign and that about 1,500,000 tons will be gathered from farms. While no estimate was made regarding railroad and street car scrap tonnage, it was stated that its recovery will entail large quantities.

Steel Pay Raise Sought as Murray Hits Lewis' Peace Plan

• • • **SWOC leaders,** headed by Philip Murray, CIO president, this week had resumed negotiations with Bethlehem Steel Co., Inland Steel Co., Republic Steel Corp. and Youngstown Sheet & Tube Co. for what union leaders described as a "substantial" increase in steel wages. The union has also requested the closed shop and check-off from these companies, a demand that may develop into one of the new War Labor Board's first important cases.

Earlier in the week Mr. Murray criticized John L. Lewis' one-man attempt to bring unity between the CIO and AFL unions. Murray, once a lieutenant of Lewis, described the mine union leader's peace proposal as a "Pearl Harbor" attack. Under Lewis' plan, Murray would have taken an $18,000-a-year job as secretary-treasurer of the combined unions, with the presidency of the combination going to George L. Meany, now secretary-treasurer of the AFL.

PERSONALS

• **L. T. Willison** has been appointed manager of ordnance sales, a newly created department of Jones & Laughlin Steel Corp., Pittsburgh. This department has been established to handle all finished war material produced by Jones & Laughlin for the U. S. Government. Mr. Willison started with Jones & Laughlin in 1927 in the industrial engineering department of the Aliquippa works. Two years later he was transferred to the metallurgical department and in 1934 was transferred to the general metallurgical department as a metallurgical engineer. In May, 1939, Mr. Willison was transferred to the cold finished sales department as assistant to the manager, where, for the past year, he has concentrated his work on steel for shells produced in automatic machines.

• **George H. Woodard** has been appointed manager of the new products division of the Westinghouse Electric & Mfg. Co., East Pittsburgh. Mr. Woodard joined the company when the new products division was created in 1936 for the development of products which have not reached the state of commercial apparatus. After filling the position of new products engineer at the Westinghouse South Philadelphia works for two years, he was transferred to the division's headquarters at East Pittsburgh in 1938. Besides directing development of new products, Mr. Woodard will continue as executive assistant in the company's emergency products division, responsible for the negotiation of government contracts for ordnance material.



L. T. WILLISON, manager of ordnance sales, Jones & Laughlin Steel Corp., Pittsburgh.

• **Guy P. Bible** has been appointed general manager of the Horace T. Potts Co., Philadelphia. **Arthur L. Collins** has been named sales manager and **Claude Mengel,** office manager and purchasing agent. **Morris E. Neeley** is the new warehouse manager.

• **Byron L. Casey** of the Chicago city sales office of the Ilg Electric Ventilating Co., of Chicago, has been named district manager of the northern territory, supervising branch offices in Chicago, Milwaukee, Minneapolis, Galesburg and South Bend. **Wallace G. Burbo** has been appointed as manager of the Boston branch office. **Charles E. Parks,** formerly manager of the Pittsburgh branch office, has been transferred to Los Angeles, where he will assume new duties as district manager of the Pacific Coast territory. Branch offices in Los Angeles, San Francisco, Seattle, Salt Lake City, San Diego, Phoenix and El Paso will be under his supervision. **Charles H. Schneider,** formerly in the Philadelphia branch office, assumes the post vacated by Mr. Parks, as manager of the Pittsburgh branch office. The Pittsburgh office now becomes a part of the Middle Atlantic territory, under the supervision of **C. W. Smith** at Philadelphia. In Houston, Tex., **W. M. Vernor** has been placed in charge of the Ilg branch office.

• **Arthur B. Schultz,** until recently the chief engineer of Kermath Mfg. Co., Detroit, has become associated with All American Aviation, Inc., Wilmington, Del., as chief engineer in charge of the experimental and development department. Mr. Schultz, a graduate of the University of Michigan, has been active in the aviation and automotive industries since 1927. In 1932 he joined Kermath as engine designer, becoming chief engineer in 1936. His work with Kermath included liaison with other manufacturers and the design of marine engines up to 500 hp., many of the latter design now being used in motor torpedo boats.

• **Haldwell S. Colby** has been appointed divisional vice-president, locomotive division, Baldwin Locomotive Works; **Frank W. Metzger,** divisional vice-president, Standard steel works division; **Frederick G. Schranz,** divisional vice-president, Baldwin Southwark division; and **Norris H. Schwenk,** divisional vice-president, Cramp Brass & Iron Foundries division. Other appointments in the locomotive division include **Amos G. Cole,** works manager, and **Lewis W. Metzger,** production manager, reporting to Mr. Colby. **Ralph W. Anderson,** formerly superintendent of motive power for the Chicago, Milwaukee, St. Paul & Pacific railroad, has been appointed assistant to Mr. Colby with particular reference to steam locomotive construction.

• **Don R. Berlin,** engineer, has resigned from the executive staff of the Curtiss-Wright Corp., Airplane division, Buffalo. Mr. Berlin, designer of the world-famed P-40 and P-36 pursuit planes series, was for seven years with Curtiss-Wright.

• **James S. Anderson** has been named to the New York district sales office of the Babcock & Wilcox Tube Co., New York. Mr. Anderson goes to the Babcock & Wilcox Tube Co. from Steel & Tubes division of Republic Steel Corp. where he was affiliated with their



GEORGE H. WOODARD, manager of the new production division of the Westinghouse Electric & Mfg. Co., East Pittsburgh.

Cleveland general sales office and more recently their Philadelphia district sales office.

• **George V. R. Mulligan,** consulting management engineer from Detroit, has been appointed vice-chairman of the Engineering Conversion Committee for the Division of Contract Distribution, OPM, Washington. His experience covers automotive, airplane and ordnance parts, stampings, forgings and other units of industry. In his position with OPM he will be particularly identified with automotive, transportation, agricultural implements and construction equipment.

• **Oliver E. Mount,** secretary and treasurer of American Steel Foundries, Chicago, was elected president of the Steel Founders' Society of America, trade association of the steel foundry industry.

• **Walter E. Bisler** has been appointed Pittsburgh district sales manager for the Pomona Pump Co., Pomona, Cal., with headquarters in the Grant Building. Mr. Bisler was formerly sales engineer for the Combustion Engineering Co. in the Pittsburgh office and was also associated with the Heine Boiler Co.

• **General Robert E. Wood,** chairman of the board of Sears, Roebuck & Co.; **General Thomas S. Hammond,** president of the Whiting Corp.; and **James F. Oates, Jr.,** of a Chicago law firm, have become full time civilian advisers to the staff of the Chicago Ordnance District. Generals Hammond and Wood will take over responsible duties for the Ordnance office. Mr. Wood will work in the field of uncovering new war production capacity and in the placing of war contracts, and Mr. Hammond will specialize in production of contracts after they are placed. Mr. Oates will assist the department's legal staff.

• **Charles L. Jones** of New York City has been elected a director of the Continental Can Co., Inc., New York. Mr. Jones, who is president of the Jones-Atkinson Corp., was formerly vice-president and a director of Socony Vacuum Oil Co., Inc., resigning a few years ago after 40 years of service here and abroad.

• **C. B. Thomas** has been named president of the Chrysler Corp. Export division, succeeding **E. C. Morse** who has been placed in charge of special war assignments. Mr. Thomas joined Chrysler in 1937 as general sales manager of export. Before that he was in charge of European operations for Hudson Motor Car Co. Morse joined Chrysler 18 years ago and has been president of the division since 1928.

• **R. H. Grant,** vice-president of General Motors Corp. in charge of sales, has been assigned to Washington to have charge of contracts between the corporation and the government in connection with war materials. Mr. Grant will continue to have general supervision over sales of General Motors and its divisions. He succeeds **James D. Mooney,** G.M. vice-president, who has been called to active duty in the Navy, heading the production engineering section of the Bureau of Aeronautics.

• **F. L. Curtis,** general manager of the Manhattan Rubber Mfg. division, has been appointed vice-president of Raybestos-Manhattan, Inc., Passaic, N. J. Mr. Curtis has been associated with the company since its beginning in 1893 and will continue as treasurer of Raybestos-Manhattan, Inc. **H. E. Smith,** assistant general manager of the Manhattan division, was appointed to succeed Mr. Curtis as general manager. **J. H. Matthews,** assistant factory manager, is now assistant general manager.

• **R. C. Cosgrove,** vice-president and general manager, manufacturing branch, the Crosley Corp., Cincinnati, will serve on the radio industry price advisory panel committee to the OPA.

• **E. G. Grace,** president of Bethlehem Steel Co., Bethlehem, Pa., has been awarded the Bessemer Gold Medal for 1942 by the British Iron and Steel Institute in recognition of his achievements in "fostering collaboration between the steel industries of two leading nations in a great world crisis." Founded in 1874, in honor of Sir Henry Bessemer, the Bessemer Gold Medal has become the most highly prized international award for achievement in the steel industry. In its 45 years, the medal has been awarded previously to only three other Americans—Andrew Carnegie, Charles M. Schwab, and Albert Sauveur, who was the first American metallurgist.

• **Frank H. Boyd,** for 30 years divisional manager, Cleveland territory, American Seating Company, has been appointed sales manager of the S. G. Frantz Co., Inc., manufacturers of magnetic separators, New York.

• **Andrew Dowdell** was presented a United States Steel Corp. service medal in recognition of 35 years of service with the Birmingham Southern Railroad during the fourth quarter of 1941.

• **Wallace N. Guthrie** has been elected executive vice-president and appointed general manager of the Cuno Engineering Corp., Meriden, Conn. He has been with the company on a part time basis for the past year in connection with work now being done by Stevenson, Jordan and Harrison, Inc., New York, industrial and management engineers of which he is a partner. Mr. Guthrie, who attended Pratt Institute and is a graduate of the University of Pennsylvania, will now devote his full time to his new position.

• **Walter A. Bowe,** advertising and public relations manager of the Carrier Corp., Syracuse, N. Y., has been elected director-at-large of the National Industrial Advertisers Association, Inc., to fill the unexpired term of R. D. Hawkins who has resigned.

• **R. D. Lawson** has been appointed salesman by the machine division, Norton Co., Worcester, Mass., for northern New England which includes the states of Vermont, New Hampshire, Maine and parts of Massachusetts and Rhode Island. He succeeds **W. E. Wickstrom** who takes over sales engineering work at the main office in Worcester.

James K. Stevenson and **Paul F. Sparrow** have been appointed salesmen for the refractories division of Norton Company and will have their headquarters in Chicago and Pittsburgh respectively.

• **James F. McNamara,** mill products sales manager of the International Nickel Co., New York, was elected a member of the board of directors of Lukens Steel Co., Coatesville, Pa. Mr. McNamara is also a director of the Harvill Aircraft & Die Casting Co., Los Angeles. Elected a director at the same meeting was **Warren H. Snow,** president of E. H. Rollins & Sons, Inc., of New York.

OBITUARY . . .

• **G. Cook Kimball,** executive vice-president, United States Steel Corp. of Delaware, at Chicago, died Jan. 12 at Passavant Hospital there, after a long illness. Mr. Kimball, who was 62 years old, had spent his entire business career in the steel industry beginning as an engineer with American Tin Plate Co. in 1901 after his graduation from Harvard University. He was executive vice-president, Carnegie-Illinois Steel Corp. from 1935 until April 1939. From 1905 to 1931 he was chief engineer of the American Sheet & Tin Plate Co. In 1931 he was elected vice-president of the company and one year later moved to Chicago to become vice-president in charge of operations of the Illinois Steel Co. In 1935 he was elected executive vice-president of Carnegie-Illinois.



THE LATE G. Cook Kimball, executive vice-president, United States Steel Corp. of Delaware.

• **Frank E. Engstrom,** 54 years of age, tool engineer for the A. O. Smith Corp., Milwaukee, died Jan. 11 at his home there.

• **J. B. Barlow,** retired industrialist of Ripon, Wis., and co-founder with J. G. Seelig of the washing machine business there, died Jan. 7 at his home in Ripon after several months' illness. He was active in the management of the business until 1927 when both he and Mr. Seelig retired. He was a trustee of Ripon College for many years.

• **S. A. Anning,** Cincinnati sales representative of the Sharon Steel Corp., Sharon, Pa., died Dec. 24. Mr. Anning joined the Sharon Steel Corp. in 1918 and was made district manager at Cincinnati in that year. Previous to that he had been associated with the Sharon Hardware Co., Sharon, and with the General Fireproofing Co. in Youngstown, Ohio.

• **Thomas H. Morcom,** general factory superintendent of the General Railway Signal Co., Rochester, N. Y., died Jan. 11, aged 57 years. Mr. Morcom joined the General Railway Signal Co. in 1912 and from 1916 to 1919 was in charge of the United States Naval Gun Factory in Rochester, after returning to the signal company as assistant production manager after the war. In 1920 he was named assistant factory superintendent and in 1931, general factory superintendent. In 1940, Mr. Morcom was put in charge of organizing the new shell-processing plant for the company and the government.

• **Robert McDougall Thrall,** assistant to Harold R. Boyer, Detroit manufacturer now director of the aircraft production division of OPM, died Jan. 7 in Johns Hopkins Hospital, Baltimore, following an operation. He was 35 years old.

• **Lyle K. Snell,** 64 years old, member of the American Society of Mechanical Engineers, the Society of Automotive Engineers, and the Engineering Society of Detroit, was buried Jan. 14.

• **Ebenezer Wright,** body designer and draftsman in the automobile industry for 35 years, died. Mr. Wright was born in Isle of Alderney, England, in 1860. His connections with the automobile industry had been with Ford Motor Co. and General Motors Corp. He retired in 1933.

• **Arthur W. Ryder,** supervisor of the machine shop of the Fore River Yard, Bethlehem Steel Co., for the past 40 years died Jan. 11.

• **Benjamin F. Ellis,** former partner in the Waltham Machine Works, Waltham, Mass., died Jan. 11. He was born in Plymouth, Mass., 84 years ago, and in 1889 established the machine works with Edmund L. Sanderson. He retired Dec. 1, 1941.

• **Louis E. Dietz,** former president of the Boss Washing Machine Co., died in Cincinnati, aged 64 years. Mr. Dietz had served as president of the Washing Machine Manufacturers' Association and of the Devices Co. He entered the business when 18 years old and became president of the Boss company at the age of 29.

• **Jacob S. Goldman,** 64 years old, president of United Brass & Aluminum Co., Port Huron, Mich., died Jan. 2 after a brief illness. He was a member of the first board of directors of the Port Huron Chamber of Commerce.

• **James F. Foley,** 78 years old, former sales superintendent of the Upjohn Co., Detroit, died recently.

• **Thomas J. Donnelly,** superintendent of the United Shoe Machinery Corp., Beverly, Mass., millwrights department, died Dec. 29, after a long illness. He was born in Pomfret, Conn., 56 years ago and was associated with the machinery company 35 years.

• **Albert G. Colvin,** New England sales representative of the Galion Iron Works of Galion, Ohio, was killed Jan. 7 in an automobile accident at Stamford, Conn. He was 62 years old.

• **Howard A. Littlefield,** pioneer manufacturer of electrical parts and an electric welder, died Jan. 9 at his home in Saugus, Mass., aged 75 years. He was a member of the firm of Thompson-Houston Co. before it was absorbed by the General Electric Co.

Catalogs Drop Farm Devices

Chicago

• • • **The farmers' "Bible"** — the mail order catalog—has brought home to him the effect of war on farm equipment production. Spring and summer catalogs of Sears, Roebuck and Montgomery Ward have dropped many farm equipment items such as disc harrows, corn planters, mowers and hay loaders. Sales emphasis is on repair parts.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Machine Tool Plans Continue Expansion Programs

Cleveland

• • • **Machine tool purchases** continue to be made by Warner & Swasey, National Acme, the Yoder Co. and other concerns whose capacities are being expanded to increase war output. To this number of important purchasers has been added the name of the Iron Fireman Mfg. Co., which is now in the market for 49 pieces of equipment, including a turret lathe, boring mill, bench and engine lathes, and various grinders and milling machines. The project has an A-1-b rating. Meanwhile, orders have been placed for induction heating equipment for the brazing of 4-lb. incendiary bombs.

The Warner & Swasey Co. is reported to have under consideration plans which, if completed, will permit a 40 per cent increase in output over present capacity which has been greatly enlarged by recent additions to plant. This further actual increase in shipments by 40 per cent is not expected to be realized until perhaps September or October of this year. At least 70 per cent of machine hours will be obtained by subcontracting. National Acme's purchases are in connection with the companys' further expansion of plant capacity by an estimated 30,000 sq. ft.

It is interesting to note that several secondary producers of turret lathes are in a position to accept orders for delivery in 30 to 60 days, but buyers apparently are holding back unless specifically directed to purchase them by OPM.

It is understood that the Warren City Tank & Boiler Co. has been purchased by Taylor-Winfield Corp.

New Business Flowing In

Cincinnati

• • • **Most machine tool** manufacturers in this area are adjusting their operations to the price ceiling order proposed last week at the Washington conference. While there has been no official announcement of the order, the general feeling is that the matter is now settled and work will proceed according to its provisions. Manufacturers are going forward with ideas for further increasing production, but the general feeling that the rumored Washington desire of an increase of three fold is next to impossible. Nevertheless, a greater output in 1942 than the record breaking 1941 is in the cards and all effort to attain it will be extended.

New business continues to flow in, in ever steady stream. In fact, several manufacturers indicated that their first-of-the-year backlog was the largest in the history of their respective companies. Others report that January contracting and inquiry is running ahead of December.

7-Day Work-Week Difficult

Chicago

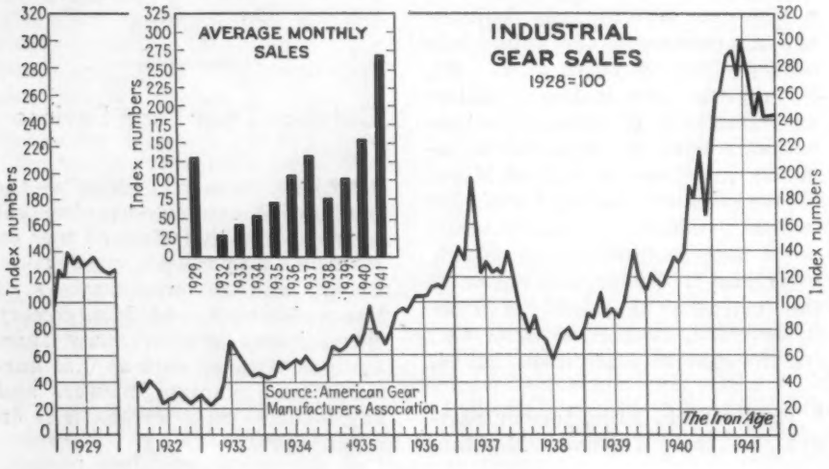
• • • **Problem of seven day** workweek in machine tools is still a stumbling block here as elsewhere. Many companies are working men individually from 60 to 65 hours weekly on two shifts of over 10 hours each and they find it difficult to ask these men to work a seventh day. If an effort is made to break these longer shifts into three eight hour turns, many producers will be forced to considerable manipulation of operating schedules. Then there is the equipment problem, too, which is not easy to solve with most companies now working on two long shifts which gives them top efficiency from their machines as constituted. These schedules would be at least temporarily impaired if a switch to 24 hour operation was made.

Some of the industry's leaders who are working for the government in the field to spur on subcontracting and other means of increasing production have found that the right hand frequently doesn't know what the left is doing. One of these men called on a small machine tool manufacturer who insisted he had no work to sublet. "Who does your gear and rack cutting?" the field man asked. It was done on the outside—but the owner hadn't looked upon this as subcontracting. Point of the story is that the industry, whether it knows it or not, is doing about all the subcontracting it can, either because it has been forced to or has always operated that way because of equipment limitations.

1941 Gear Sales 74.4% Above Previous Year

• • • Sales of industrial gears in 1941 showed a gain of 74.4 per cent over the 1940 volume, the American Gear Manufacturers Association reports. The association's index of sales, which excludes automotive high speed turbine drive gears, shows an average of 269 for the 12 months of 1941, compared with 155 in 1940. The average for 1929 was 128.5.

The gear sales index for December was 243, a gain of 2 points over the preceding month, but 56 points below the all-time high of 299 recorded in June, 1941. The December, 1940, index was 208.



NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

6.5c. a lb. Ceiling Set on Pig Lead

• • • **Primary interest** in the nonferrous field this week centered on the price schedules inaugurated by OPA on primary lead, secondary and scrap lead and special shapes. A ceiling of 6.50c. a lb., delivered New York, has been set for primary lead as of Jan. 13, an increase of .65c. a lb. over the price manitained by agreement between the industry and OPA for the past many months. The schedule covers all buyers, sellers, producers, jobbers, dealers and plumbing supply houses.

The ceilings for scrap and secondary lead are keyed directly to the ceiling on primary lead, as is the schedule set for special shapes. A maximum of .50c. a lb., above the pig lead price of the equivalent grade was set for shapes. Complete details of the schedule are listed on page 85.

Prices for aluminum plant scrap have been rearranged to facilitate operation of a segregation order issued recently by OPM. To encourage the segragation of such scrap, the price amendment makes two changes to permit primary producers and secondary smelters to pay premium prices. The amendment eliminates from the schedule all segregated solid plant scrap except pure aluminum and it establishes a 1c. a lb. differential between segregated and mixed turnings and borings.

Changes in premiums on less than carload shipments of copper from refineries were made in an amendment to the copper price schedule. Important among the changes were: (1) A reduction of .25c. a lb. in the premium that may be paid on producers' sales of small lots of casting copper, (2) A change in the ceiling on l.c.l. lots of copper other than casting to 12.125c. a lb. refinery, as compared with the previous 12.50c. price, delivered Connecticut Valley, (3) A Provision permitting any person to sell copper to MRC, other government agencies or corporations previously approved in writing by OPA at prices higher than the listed maximum prices, (4) Discontinuance of a previous provision allowing dealers to resell their copper inventories purchased over 12c. a lb., at a base price of 12.50c. Other changes were also made.

OPA has undertaken a survey of copper customs smelters to determine the amount of excess refining capacity that could be used if large supplies of scrap were released by MRC. Revere Copper and Brass Co., Inc., announced that its $10,000,000 Chicago plant, built for the war department, is in partial production five months ahead of schedule, to produce cartridge cups, bullet jackets and ordnance brass.

Tin Order M-43, restricting the sale and delivery of tin in retail lots, was amended to provide that the distributor in absence of direction from OPM is authorized to deliver tin to his regular customers in lots of three tons or less, up to but not exceeding a total of five long tons to any one customer in the same month, provided the aggregate of such deliveries which any customer may receive from all distributors shall not exceed five tons in a month.

Non-Ferrous Prices

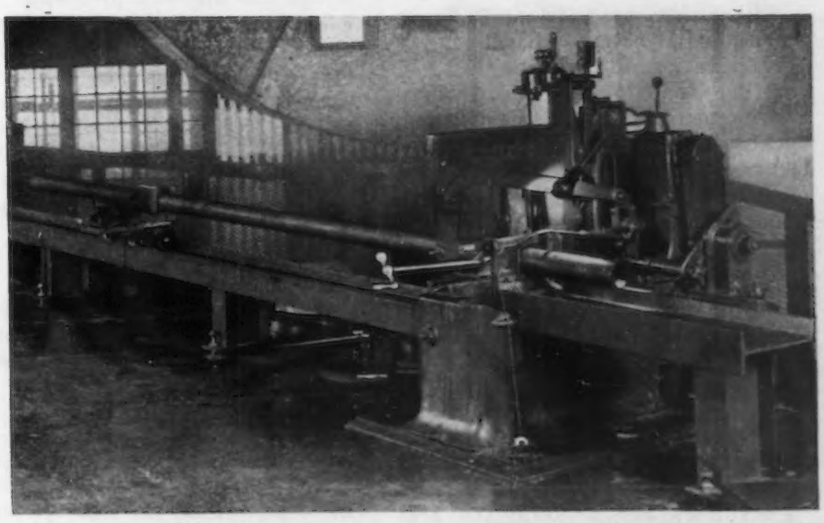
(Cents per lb. for early delivery)

Copper, Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead, St. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $199 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.



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The most economical method of cutting-off identical pieces from bar steel is with a MARVEL Automatic Production Saw. It will give you more pieces per hour, per machine and per dollar cost than any other accurate cutting-off method. Figured in cost per piece, it will have the lowest labor cost too, because MARVEL Automatic Saws operate with no more attention than an automatic screw machine. They keep chip loss down to a minimum and on many jobs will give you extra pieces per bar.
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Changes in Grading Threaten Permanent Scrap Industry Shift

Chicago

• • • **The scrap business** in this country is facing a serious problem caused, it is true, by war and the shortage, but a problem that transcends for the industry itself the job of getting out more scrap alone. The structure of the scrap business as it has always been known is in danger of emerging from the war in an entirely new dress.

Today, the industry finds not only that many of its individualistic methods of doing business are outlawed, but it faces technical changes in grading that have upset regular sources and outlets for scrap. For instance, low phos has always been an electric furnace and acid open hearth grade. Latest official change on this item issued several weeks ago rules that low phos of less than ¼ in. thickness is now classified as "inferior." Actual result is that scrap people will either have to upgrade or withhold the item until they get a clarification on the ruling.

The industry is jittery. One prominent broker in the midwest recently told THE IRON AGE that he flatly refused to touch cast scrap because of the host of opposing regulations that have piled up on these classes. He felt the risk of violation was too likely to make it worthwhile for the profit involved.

Dealers accustomed to selling their scrap through brokers for years are now selling direct; and unconsciously perhaps are changing their whole set-ups for the future. They are being tugged by consumers and brokers; the first so anxious to get scrap that they have been forced to abandon former sources of supply; the second faced with volume that is probably not 25 per cent of a year ago now desperate to stay in business. Many dealers are riding with the tide while others have practically given up scrap and are devoting themselves to other sources of revenue.

Brokers' volume has diminished almost to the vanishing point. One firm hasn't sold 10 cars of cast in the past four months. Another is said to have moved two truckloads of scrap in one whole day last week. One spent a whole day last week without buying a ton. Brokerage salesmen who have gone out on scouting trips of several weeks' duration have failed to return with enough scrap to pay expenses.

Some experts estimate that 50 per cent of scrap moved today is via the direct method. Many mills are making an effort to buy through brokers even when they dig up a new source on their own. But steel producers have been and are so desperate to get scrap that generally they can't stop to worry about the broker's problems. And even though the government stated that anyone not a broker before April 3 could not get a broker's commission, many dealers are still getting it. Added to this, is the vast increase in industrial buying that has taken place. Well known, but generally denied vigorously, is the policy of selling scrap to the mill where steel is bought.

Labor for the preparation of scrap is very scarce because of war industries. The cost of available labor has jumped to almost double.

Weekly Bookings of Construction Steel

Week Ended →	Jan. 20, 1942	Jan. 13, 1942	Dec. 22, 1941	Jan. 21, 1941	Year to Date 1942	Year to Date 1941
Fabricated structural steel awards	29,000	48,000	5,130	43,850	93,200	117,850
Fabricated plate awards	2,500	0	1,225	930	2,500	2,430
Sheet steel piling awards	0	0	0	665	0	2,415
Reinforcing bar awards	28,200	55,000	11,100	10,710	145,200	29,655
Total letting of Construction Steel	59,700	103,000	17,455	56,145	240,900	152,350

Pipe Lines

• **Louisiana-Nevada Transit Co.,** Cotton Valley, Webster Parish, La., plans new welded steel pipe line from main natural gas transmission system to point near Ada, Okla., for gas service in that area. Cost over $60,000 with operating facilities.

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 30 for 18,000 ft. of black carbon welded steel pipe; also for 700 steel boiler tubes, seamless or electric-resistance welded (Schedule 5908).

Water Department, Yakima, Wash., plans steel pipe lines for extensions and replacements in water system. Cost about $200,000. Financing has been arranged through federal aid. N. A. Gilman is superintendent.

Wisconsin Gas Transmission Co., affiliated with Independent Natural Gas Co., 735 North Water Street, Milwaukee, both subsidiaries of Phillips Petroleum Co., Bartlesville, Okla., is securing rights-of-way and priority rating for steel pipe for proposed new 20 and 22-in. welded steel line from gas field in Moore County, Panhandle district, Tex., to Milwaukee and vicinity, about 918 mills, recently noted in these columns. New line will be used for natural gas transmission for wholesale supply for about 10 public utility companies in southern and eastern Wisconsin, which will distribute locally. About 818 miles of total distance will be of larger sized pipe noted, and remainder in Wisconsin, 20-in. Conditional permission has been secured from State Public Service Commission, Wisconsin, for construction. Cost close to $40,000,000 complete, instead of smaller sum previously stated, including booster stations, meter and control stations and other facilities.

City Controller, City-County Building, Pittsburgh, asks bids until Jan. 28 for black steel pipe for Department of Public Works.

Stanolind Oil & Gas Co., Gulf Building, Houston, Tex., and Humble Oil & Refining Co., Humble Building, same city, plan joint construction of new 4-in. welded steel pipe line from gas field district about 45 miles from Katy, Tex., for natural gas transmission for supply for recycling plant at latter place. Also will drill about eight new wells in gas area, with gathering system and other facilities, including compressor station. Entire project will cost over $250,000.

Purchasing and Contracting Officer, Office of Post Utilities, Fort Riley, Kan., closes bids Jan. 26 for 13,000 ft. of galvanized steel pipe (Invitation U-735-1).

Cast Iron Pipe

• **Village Council,** Lucas, Ohio, plans pipe line extensions in water system and other waterworks installation. Cost about $180,000. Proposed to arrange financing through federal aid.

Board of Arlington County Commissioners, Water Department, Court House, Arlington, Va., will have plans drawn by Chester Engineers, Inc., 210 East Park Way, Pittsburgh, consulting engineer, for pipe line extensions in water system and other waterworks installation, recently noted. Cost about $587,000, with financing in that amount arranged through federal aid.

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 27 for cement-lined cast iron water pipe fittings (Schedule 5911).

Lawton, Ohio, plans pipe line extensions, including new line from Lake Lawtonka, main supply lines to city limits, and other lines to new districts in municipality. Cost about $135,650. Work will be carried out in conjunction with development of water source at Medicine Park, where new filtration plant, resettling basins and other facilities will be installed; and extensions and improvements in fire-protection system. Entire project will cost $576,900, of which $300,000 will be a bond issue, recently voted, and $276,900 a federal grant.

Columbus, Ind., plans pipe line extensions and replacements in water system, and other waterworks installation. Cost about $350,000. Bond issue in that amount will be arranged.

Charleston, S. C., plans main pipe line from city to St. Andrew's Parish, for water supply in that district. Cost about $100,000. Financing in part, $74,500, has been arranged through federal aid.

SCRAP

. . . MARKET ACTIVITIES AND PRICE TRENDS

Service Charge Urged for Dealers Lifting Rails

Philadelphia

• • • **Current rumors** about service charges paid scrap dealers for services they render consumers outside their regular work, such as recovering rails from streets and wrecking automobiles that they purchase intact, were brought to a head on Wednesday evening, Jan. 14, at the monthly meeting of the Philadelphia Chapter of the Scrap Institute. Charles C. Steel of the Jersey Shore Steel Co., Jersey Shore, Pa., announced that his firm was inaugurating a radio campaign to facilitate the collection of steel rails from abandoned street car lines and railroads, and that efforts would be made to pay scrap dealers an additional service charge if they would handle the lifting of such rails.

Estimating that the 20,000 tons of rails that could be lifted from the streets in and around Philadelphia would cost the scrap dealers about $10.00 a ton to collect, Mr. Steel said that dealers were entitled to a service charge of some kind to compensate for this added cost, and that his firm would attempt to pay such costs as may be incurred.

The statement caused quite a discussion among dealers, who felt that if such a program were inaugurated for the collection of steel rails, similar charges could be made for other work that the dealer might do, such as dismantling and scrapping automobiles purchased intact from auto wreckers and cutting up scrap from demolished buildings and machinery.

Allegheny-Ludlum Forms New Salvage Department

Pittsburgh

• • • **Allegheny-Ludlum Steel** Corp. has created a new scrap and salvage department to be located at the company's Brackenridge, Pa., plant under the management of E. L. McGraw, formerly director of purchases, who will be assisted by E. A. Grine, according to William F. Detwiler, board chairman.

The newly created department will continue to search for every possible means of stopping waste and saving strategic metals and alloys both in its own housekeeping and in the plants of those who use Allegheny's products.

L. H. Bittner has been named director of purchases, succeeding Mr. McGraw. He has been in the Brackenridge purchasing office for several years and formerly had charge of purchases at the company's Dunkirk, N. Y., plant. He will be assisted by N. W. Hayson.

Scrap Convention Set for Feb. 21-22

• • • **The Institute of Scrap Iron & Steel's annual convention has been rescheduled for Feb. 21-22 at Hotel Sherman. Chicago. The original convention, to have been held Jan. 6-8, was postponed. United States and Canadian government officials will address the convention.**

"Thar's Gold in Them Streets, Stranger"

Chicago

• • • **Railroad officials here estimate a reservoir of over 250,000 tons of rail scrap exists in abandoned street railway and interurban lines but that little is being done about picking it up due to the cost. In 1941, there were 1537 miles of railroad track abandoned which yielded about 100 tons of scrap rail to the mile. All of this has been picked up, but little of it has gone into scrap piles since it has been found useful in army camps, arsenals and other war projects.**

Seattle

• • • **The federal government through the WPA is getting ready to dig under Pacific Northwest streets for thousands of tons of scrap steel.**

Seattle has 16,000 tons of abandoned street car rails and Bellingham 12,000 tons under asphalt.

Burned Tin Cans Being Charged By Scrap-Hungry Mills

• • • **Holding firmly** to the belief that 1942 steel production may be lower than in 1941 because of the scrap problem, mills are beginning to experiment with light grades of scrap which a year ago would have been entirely out of the question.

In the East, scrap collectors for several months have been burning the tin off old cans in bonfires and sending the charred scrap to steel plants. One mill in the Pittsburgh-Wheeling-Weirton scrap district is experimenting with the use of partially detinned cans for use in steel melting. A small amount has been utilized already and the operations, as well as the various heats of steel, are being watched closely. While the company refuses to give any detailed information on the experiment, it is believed that the steel containing such scrap is probably being isolated to a single furnace where close control can be maintained over the finished raw steel as well as the scrap resulting from subsequent finishing operations. It is believed the total tonnage of cans is being kept to a minimum.

Meanwhile, in an effort to salvage the tin from old cans, two large detinning firms recently met with the government at Washington. It is expected more than 1200 tons of tin a year may be obtained from an enlarged detinning program, which also will yield more steel scrap after the tin has been removed from the cans.

Last week's announcement that a drive will be conducted to end misgrading of iron and steel scrap, through an OPA staff of inspectors, is a development welcomed by many steel mills and foundries. In order to get scrap it has been necessary oftentimes for consumers to permit upgrading which in effect meant paying prices higher than the established ceilings.

The OPA inspectors will appear at consumer plants without advance notice. Scrap found to be upgraded will be recommended for reclassification, and sellers and

consumers will be liable to penalties provided for violation of Price Schedule No. 4, revised.

Although the scrap schedule brought out in late December was aimed at halting misgrading, it merely created more problems along that line. Heavy breakable cast began appearing in some shipments of No. 1 heavy melting steel because dealers claimed the revised schedule made it unprofitable to break cast scrap.

In order to get cast scrap, buyers in some sections of the nation have been taking large quantities of steel scrap which they did not require. By doing this, dealers with large inventories of steel scrap were assisted. The result is that at some points cast scrap consuming plants hold heavy supplies of steel scrap, more than actually needed.

Another recently rumored malpractice is that some small scrap consumers are reported to be sending trucks to scrap yards and paying cash for the material received, with no records kept of the transaction. This is by no means a widespread practice, however.

City Trucks Begin Collecting Scrap

Birmingham

• • • City garbage trucks will begin collecting scrap saved by householders and the city will sell the material to local yards, turning proceeds over to a special defense fund.

Ordnance Office Assists Drive

Cleveland

• • • The Greater Cleveland scrap drive will include collaboration of the local committee with the Cleveland Ordnance Office in canvassing industrial concerns in this area for possible available scrap. Members of the Northern Ohio chapter of the Institute of Scrap Iron & Steel will absorb any loss resulting from payment to the city of $18.85 a ton for scrap, some of which, to be secured from public collections, probably will be unsuitable for use in steel plants.

PITTSBURGH—Brokers and consumers alike are feeling the effects of the cold spell prevalent here more than a week ago, at which time collections were reduced by more than one-half. Supplies are tighter than at any time in the current shortage period. Carnegie-Illinois Steel Corp. still has six open hearth furnaces idle, three for lack of scrap, while American Rolling Mills plant at Butler, Pa., is reported to have two furnaces off because of the scrap shortage. Some other mills continue on the "ragged edge" with efficiency affected and with the probability that any day one or more units may be taken out of service.

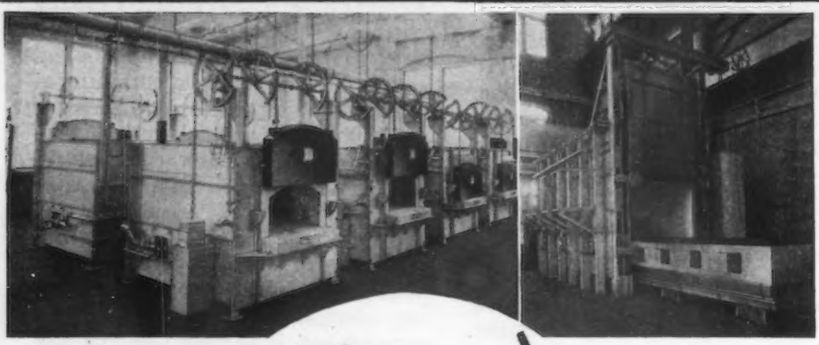
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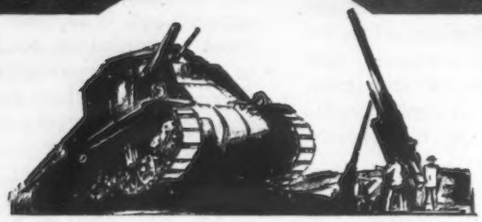
ST. LOUIS—The shortage of scrap becomes more and more acute. One large mill has almost exhausted its reserves, while another took one furnace out because of the shortage. Receipts from the country are disappointing, but more open weather is expected to help the situation. Drastic government steps are being talked of to force out tonnages from automobile junk piles. The advertised exchange of groceries for scrap brought out a total of 20 tons.

•

COLUMBUS, OHIO—A pledge to clean up the scrap in their yards was given to Gov. John W. Bricker, by 250 Ohio auto wreckers who agreed to junk all cars older than 1933 models to provide an estimated 100,000 tons of scrap. B. J. Solomon, president of the Ohio association, estimated that a million and a half tons of scrap would be available if every

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Oil Concern Starts Voluntary Scrap Drive

New York

• • • Several thousand metal equipment items which are usable but obsolete will be examined with a view toward throwing them away, under a voluntary scrap drive begun by American Oil Co. at its numerous plants and bulk stations. Committees have been named at each of the company's properties. Routine scrap collections will be expedited and the scrap sold monthly instead of every 90 days as at present.

wrecker in the country followed this program.

•

CLEVELAND—Scrap collections are reported slightly better. While this will temporarily stave off some additional open-hearth shutdowns, the situation remains critical and a prolonged cold wave with snow would close some open-hearths in short order. Meanwhile, progress is being made in the launching of a statewide collection drive, and Governor Bricker of Ohio has appointed Lee E. Pierson as head of a committee to handle the necessary details. This drive will be an extension of local scrap drives. At Youngstown, the construction of ore-treating and sintering plants by Sheet & Tube and Republic Steel is expected to push up pig iron production and thus help ease the scrap situation to some extent. Three of the idle stacks in this district will probably be operated again this week thanks to a temporary betterment in the scrap situation.

•

BIRMINGHAM—The city government has adopted a plan whereby municipal garbage trucks will collect scrap saved by householders. The city subsequently will sell this scrap to local yards at the current market price and apply the proceeds to financing the community's civilian defense program. This plan was adopted as the flow of material into this district showed little prospect of building up depleted stock piles at steel mills.

•

CINCINNATI—River ice has been hampering shipments of both scrap and pig iron to local producers. One steel producer reports a slow up in slab shipments because barges are frozen in the river. The foundry scrap shortage continues to dominate the market although one steel producer reports a reduction of active open hearths from six to four because of lack of scrap. Allocations are desired. One group of consumers is in Washington to request allocation of foundry and cast grades.

•

BUFFALO—Severe weather conditions still account for the fact the scrap situation is virtually "frozen" in this district with supplies now at the lowest point since January, 1941, and collections still on the down grade. One of the area's largest foundries, long operating on a hand-to-mouth basis, last week threatened to shut down completely for lack of scrap, but dealers got together and rounded up approximately 25 truck loads of unprepared scrap in a single day to keep this foundry at work on its production of steel castings for the war program.

•

TORONTO—While scrap resources have not been exhausted, they are rapidly being depleted and to provide against dire shortage of raw materials for steel making, announcements were made during the week to the effect that Canada's pig iron production capacity will be increased by about 2000 tons per day, the increased output to be available in 1943. It is estimated there is sufficient scrap available to meet most requirements this year, but beyond that the question of supply is doubtful.

•

BOSTON—Continued low temperatures are holding up the movement to yards and consumers alike. The movement of shop scrap continues on schedule, however. Because they could not fill old orders, dealers claim they lost money on cast.

Turn Page for Scrap Prices

TRADE AUTOMATIC MARK

Manufacturers for Over Thirty Years

MODERN
Electric Propelled INDUSTRIAL TRUCKS

FOR ECONOMICAL MATERIALS HANDLING

- FORK AND RAM TRUCKS
- LOW AND HIGH LIFT TRUCKS
- COIL AND SHEET HANDLERS
- LOAD CARRIERS
- TRACTORS — CRANES

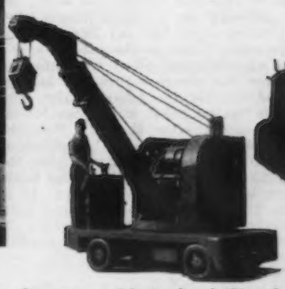
Capacities 1000 to 60,000 lbs.



Low Lift Skid Platform Type



Fork and Ram Trucks
Telescopic and Non-Telescopic for Pallet and Coil Handling



Cranes — Motorized Slewing Type—Four Motor Control for Individual and Simultaneous Operation



High Lift Skid Platform Type



Light Duty Fork Trucks



Die Handlers Heavy Duty Type with motorized die and unloading platform



Coil and Sheet Handlers

REQUEST DETAILS AND LITERATURE

Listed Under Reexamination Service of UNDERWRITERS' LABORATORIES

AUTOMATIC TRANSPORTATION CO.
75 W. 87th St. Div. of the Yale & Towne Mfg. Co. CHICAGO, ILL.

SCRAP PRICES

Revised to Dec. 23, 1941

(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)		ELECTRIC FURNACE AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
		Machine Shop Turnings		Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	18.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	22.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of South San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are taken for purposes of deducting. For exceptions see official order.

REMOTE SCRAP: Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap."

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails		
				3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Stove plate	14.00	15.00	16.00
Heavy breakable cast	16.50	17.50	18.50
Charging box size cast	17.25	18.25	19.25

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes all states not named in groups A and B.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Jan. 20, 1942	Jan. 13, 1942	Dec. 22, 1942	Jan. 21, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy booms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Jan. 20, 1942	Jan. 13, 1942	Dec. 22, 1942	Jan. 21, 1941
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	24.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$21.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.00
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	18.00
Low phos. plate, Youngs'n	23.00	23.00	23.00	24.50
No. 1 cast, Pittsburgh	22.00	22.00	22.00	22.00
No. 1 cast, Philadelphia	24.00	24.00	24.00	23.75
No. 1 cast, Ch'go*	21.00	21.00	21.00	18.75

*Changed to gross ton basis, April 3, 1941.

Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.125	$6.125	$6.125	$5.50
Foundry coke, prompt	6.875	6.875	6.875	5.75
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	50.15
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	5.70	5.70	5.70	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 108 to 114 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 20, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.45 a Gross Ton	$20.42 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars **	Pacific Ports, Cars **	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									-4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢					2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10						$5.32
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			3.37¢
TERNES, M'FG.															
Special coated, basebox	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton = 2.70¢					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont = 2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(11)		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributors. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. **Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland.	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

	Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem	$54.00

TOOL STEEL

(F.o.b. Pittsburgh)	*Base per Lb.*
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	$25.50	$25.00	$26.50	$26.00	.....	.....
Brooklyn	27.50	.....	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.. ..
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....
St. Louis	24.50	24.02	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	....$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	26.63	.....	27.13	26.63	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	27.50	.....	.....	.....	.....	.....
San Francisco	27.50	.....	.....	.....	.....	.....
Seattle	27.50	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace **$23.50**

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of basic grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, *Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices.)*

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.25	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.65
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.90	4.23	6.85
Sheets, galvanized	4.65	4.85	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.50
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43.

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Lap Weld, Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price = $200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.



A-26 HEAVY DUTY

Temp. Limits:—2600° F. on hot face.
Crushing Strength (cold)—409 lbs. per sq. in.
Weight, standard straight—2.80 lbs. each.



A-23 HEAVY DUTY

Temp. Limits—2300° F. on hot face.
Crushing Strength (cold)—491 lbs. per sq. in.
Weight, standard straight—2.75 lbs. each.



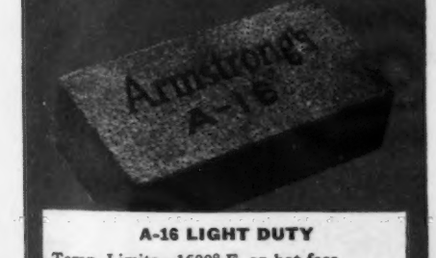
A-25 LIGHT DUTY

Temp. Limits—2500° F. on hot face.
Crushing Strength (cold)—325 lbs. per sq. in.
Weight, standard straight—2.35 lbs. each.



A-20 LIGHT DUTY

Temp. Limits—2000° F. on hot face.
Crushing Strength (cold)—227 lbs. per sq. in.
Weight, standard straight—1.90 lbs. each.



A-16 LIGHT DUTY

Temp. Limits—1600° F. on hot face.
Crushing strength (cold)—186 lbs. per sq. in.
Weight, standard straight—1.80 lbs. each.

27 Years' Experience

SAVING FUEL—CONTROLLING HEAT

LIGHTWEIGHT ARMSTRONG'S INSULATING FIRE BRICK have been improving furnace operation since 1914

TWENTY-SEVEN years ago, Armstrong introduced what was then a radically new type of furnace insulation—*lightweight* insulating brick. Today, *five* different types of LIGHTWEIGHT ARMSTRONG'S INSULATING FIRE BRICK are saving fuel, speeding production, and aiding accurate temperature control in furnaces throughout the country. These five brick, for temperatures from 1600° F. to 2600° F., embody the many improvements Armstrong has pioneered during 27 years of leadership in the field.

PERFORMANCE TESTED

All essential requirements for efficiency, i. e., low thermal conductivity, high physical strength (hot and cold), light weight, low shrinkage, and high resistance to spalling are met by the proper combination of characteristics in each Armstrong's Brick. Lasting satisfactory performance in the field, and rigid laboratory tests have proved that all five Armstrong's Brick are ideally suited to the service recommended.

MONEY-SAVING ADVANTAGES

Armstrong's Brick arrive on the job in good condition. They are accurately sized so that they lay-up quicker, assure a heat-tight job, and increase construction strength. These lightweight brick have exceptionally low heat storage capacity which means they heat up quicker and cool off quicker. Batch type or intermittent furnaces heat and cool more quickly and with valuable fuel savings.

All Armstrong's Brick are available in special shapes to assist in unusual furnace constructions, or in standard sizes which may be notched, grooved, and shaped with a saw or rasp right on the job. Thus, there is no need to stock large inventories of unusual sizes and shapes for repair purposes.

ENGINEERING SERVICE

Qualified Armstrong engineers will be glad to assist you in the selection of proper insulating brick and cements and their application. For information about this service, and folders about Armstrong's Insulating Fire Brick and Cements, write today to Armstrong Cork Company, Building Materials Division, 978 Concord Street, Lancaster, Pa.



The unusually high spalling resistance of Armstrong's Brick is proved in this test which subjects panels of brick alternately to 2000° F. and 1400 c.f.m. of air at 70° F. 10 times in 10-minute cycles after a 24-hour pre-heat at recommended top service temperature.



Crushing strength tests prove that lightweight Armstrong's Insulating Fire Brick have exceptionally high load bearing characteristics. Heavy duty brick resist pressures up to 430 pounds per square inch—assurance that they will stand the gaff in your furnaces.

ARMSTRONG'S
INSULATING REFRACTORIES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio.....$29.50*
Buffalo $30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... $2.00
Ferrotungsten, 100 lb. and less $2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equalized with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.... $4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn..65c. to 66c.
African, Indian, 49-51 Mn..67c. to 69c.
Brazilian, 46-48 Mn.....69c.
Cuban, 51 Mn .....78c.

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..Nom.
Rhodesian, 45 .....$32.00
Rhodesian, 48 .....$39.00-$40.00

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

Connellsville, prompt ...$6.00 to $6.25

Foundry

Connellsville, prompt ...$6.75 to $7.00

*Maximum coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey.... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

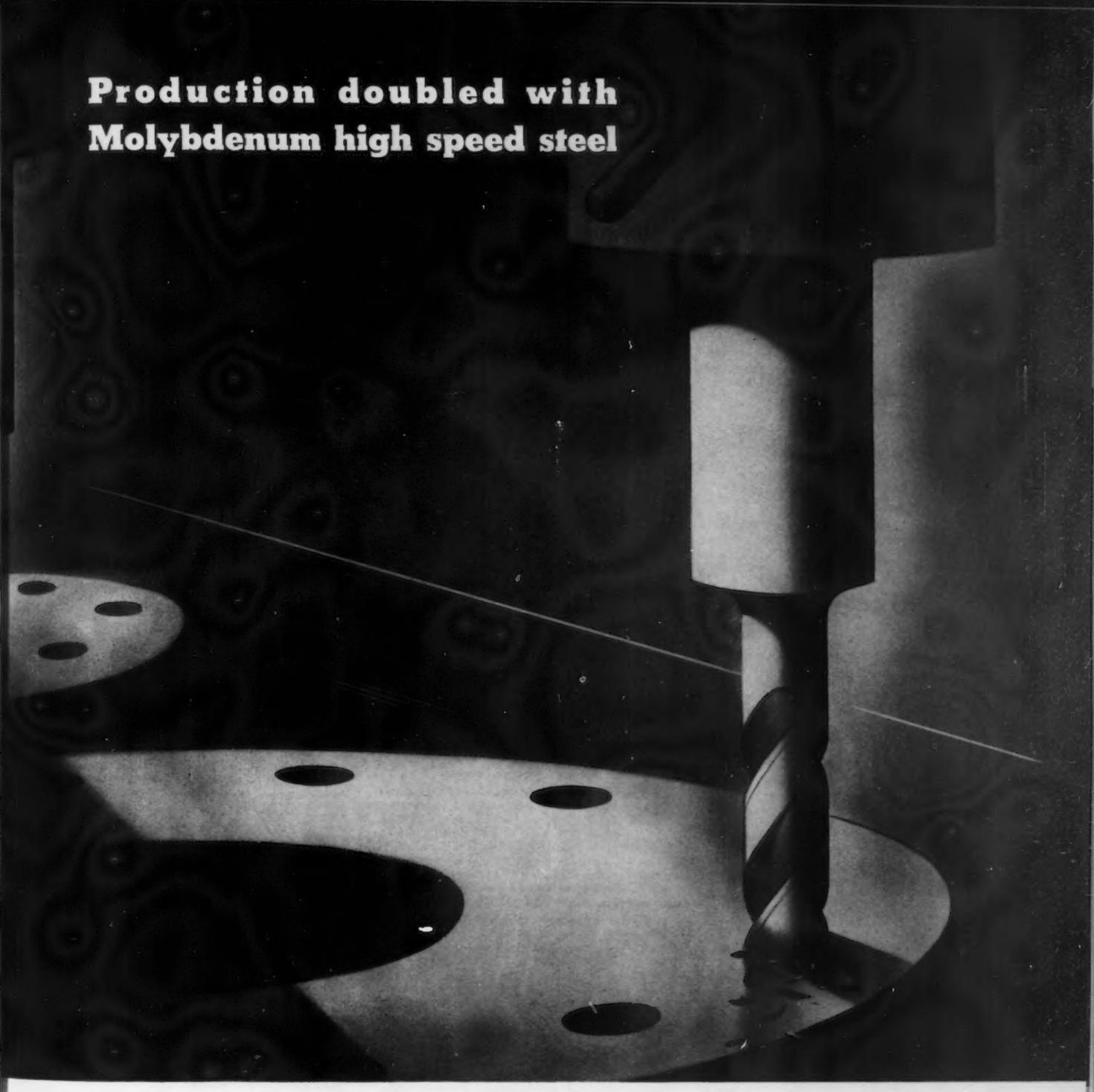
Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks.....$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

Production doubled with Molybdenum high speed steel



The working efficiency of Molybdenum high speed steels is a matter of record in hundreds of shops. The following is an example of what a changeover to a Molybdenum high speed steel accomplished in one plant.

Operation: Drilling holes 1⅛" diameter by 7" deep.

Material: Manganese steel (1320).
Hardness: 32 Rockwell "C".

The Molybdenum high speed drills on this job increased production between regrinds 100%.

Your supplier can help you select the type of Molybdenum high speed steel best fitted for meeting your production requirements.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED · FERROMOLYBDENUM · CALCIUM MOLYBDATE

Climax Molybdenum Company
500 Fifth Avenue · New York City

MOLY

SALES POSSIBILITIES

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **Vought-Sikorsky Division,** United Aircraft Corp., Stratford, Conn., has let general contract to Edwin Moss & Son, Inc., 555 Grant Street, Bridgeport, Conn., for three one-story additions, two about 30 x 95 ft., and other, 40 x 75 ft., for storage and distribution. Cost close to $75,000 with equipment.

Charles J. Dickgiesser & Co., Inc., Derby, Conn., sheet metal products, has let general contract to Max A. Durrschmidt, 100 Main Street, for one-story addition, 50 x 150 ft. Cost close to $50,000 with equipment.

Van Norman Machine Tool Co., Inc., 3640 Main Street, Springfield, Mass., milling machines, grinders and parts, has work under way on one-story addition, about 50 x 110 ft. Ley Construction Co., 1215 Main Street, general contractor, for expansion at National plant, where production is being concentrated. Cost close to $50,000 with equipment.

Zenith Products, Inc., 58 Chestnut Street, West Newton, Mass., pumping machinery and parts, has asked bids on general contract for new windowless-type plant in Allston Park district, Nonantum, Mass., with main one-story unit, 120 x 200 ft., and auxiliary structures, for production of hydraulic pumps and fluid motors for government. Cost about $500,000 with machinery, fund in that amount to be furnished by Defense Plant Corp., Washington. Donald Des Granges, 49 Federal Street, Boston, is architect.

Bard-Parker Co., LeeMac Avenue, Danbury, Conn., surgeon's knives and kindred precision cutlery, has let general contract to B. J. Dolan, 207 Greenwood Avenue, Bethel, Conn., for one-story addition. Cost close to $40,000 with equipment. Edmund B. Watson, Mill Plain Road, Danbury, Conn., is architect.

Peerless Aluminum Castings Co., Andover and Albion Streets, Bridgeport, Conn., aluminum, bronze, brass and other metal castings, has let general contract to Edward E. Bray Co., Inc., 362 River Street, for one-story addition, 65 x 140 ft. Cost over $50,000 with equipment. Peter P. Petrofsky, 955 Main Street, is architect.

Construction Quartermaster, Section F, Army Base, Boston, has let general contract to Tredennick-Billings Co., 10 High Street, for one-story building, No. 41, at Watertown arsenal, Mass., at $274,784 exclusive of equipment, for expansion in shop facilities.

American Can Co., 230 Park Avenue, New York, through recently organized subsidiary, American Corp., plans new plant on West Roosevelt Road, Forest Park, near Chicago, for production of torpedoes for government. It will comprise one-story buildings, with power station, machine shops and other structures. Cost about $10,000,000 with equipment, fund to be provided by Defense Plant Corp., Washington.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 29 for 3300 steel wire rope marline spikes for Brooklyn Navy Yard; also for 3581 similar spikes for San Diego, San Francisco and Oakland, Cal., yards (Schedule 9968).

General Electric Co., Schenectady, N. Y., has let general contract to Austin Co., Cleveland, for one-story addition, 60 x 500 ft. Cost over $750,000 with equipment.

Brewster Aeronautical Corp., 34-01 Thirty-eighth Avenue, Long Island City, aircraft and parts, has let general contract to Barclay White Co., 22 North Thirty-sixth Street, Philadelphia, for one-story addition, about 300,000 sq. ft. of floor space, to branch plant at Hatboro, Pa., for expansion in assembling division for bomber-type airplanes for government; also for two-story office structure. Cost close to $1,500,000 with machinery. Financing will be provided by Defense Plant Corp., Washington. Silverman & Levy, Architects' Building, Philadelphia, are architects.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., has let contract to George Hoffman & Son, Inc., 1071 Washington Avenue, New York, for one-story shop addition at $85,939, exclusive of machinery, for production of gun liners.

Vanadium Corp. of America, Inc., Saunders Settlement Road, Niagara Falls, N. Y., has begun work on two one-story additions, 50 x 400 ft., and 50 x 180 ft., for which Walter S. Johnson Building Co., 2532 Hyde Park Boulevard, is general contractor. Cost over $350,000 with equipment.

A. & P. Food Stores, Inc., 420 Lexington Avenue, New York, has let general contract to Dawson Brothers Construction Co., Inc., Union Building, Syracuse, N. Y., for three-story addition, 100 x 100 ft., to bulk storage and distributing plant at 624 Erie Boulevard West, Syracuse, operated under name of Great Atlantic & Pacific Tea Co. Cost over $125,000 with equipment. Lawrence M. Cook, 250 Whittier Avenue, Syracuse, is architect.

Harris Structural Steel Co., New Market, N. J., has arranged for purchase of about 42 acres in Maurer district, Perth Amboy, N. J., heretofore held by city, and will use section of land for construction of steel vessels for government. It will comprise several ways, with one-story shops and other structures. Cost over $200,000 with equipment.

Wright Aeronautical Corp., 132 Beckwith Avenue, Paterson, N. J., airplane engines and parts, has let general contract to Edward M. Waldron, Inc., 40 Park Place, Newark, N. J., for extensions and improvements in building No. 5. Cost over $60,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., New Center Building, Detroit, is architect and engineer.

Ferdon Equipment Engineering Co., Inc., 810 Broad Street, Newark, N. J., floor trucks and other mechanical-handling equipment, has let general contract to D. O. Evans, 1445 North Broad Street, Hillside, N. J., for one-story plant, about 10,000 sq. ft. of floor space, at Hillside. Cost about $45,000 with equipment.

Worthington-Gamon Meter Co., 282-96 South Street, Newark, liquid meters and parts, subsidiary of Worthington Pump & Machinery Corp., Harrison, N. J., has asked bids on general contract for one-story addition, about 60 x 70 ft., for expansion in machine shop. Cost close to $40,000 with equipment. John D. King, 695 Ridge Street, is architect.

Mansfield Recovery Corp., 40 Wall Street, New York, has closed agreement with city officials at Perth Amboy, N. J., for recovery of iron and steel scrap from waste deposits at former plant of Pardee Steel Co., vicinity of Sheridan and Herbert Streets, on site owned by city. Company will use a magnetic process and will equip plant at early date. Estimated expenditure of $100,000 will be made for recovery of metal, with municipality to receive royalty per ton recovery.

Standard Oil Co. of New Jersey, Inc., 26 Broadway, New York, has let general contract to Arthur G. McKee & Co., 2300 Chester Avenue, Cleveland, for new multi-story power house, about 50 x 60 ft., at Bayway oil refinery, Elizabeth, N. J. Cost over $75,000 with boiler units and other equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 29 for 349 foundry sieves for Philadelphia Navy Yard; also for 960 similar sieves for Mare Island Navy Yard, Vallejo, Cal. (Schedule 9999).

R-S Products Corp., 4530 Germantown Avenue, Philadelphia, industrial furnaces, oil burners, blast gates, etc., has acquired one-story building on adjoining site, 110 x 168 ft., for expansion.

SKF Industries, Inc., Front Street and Erie Avenue, Philadelphia, ball and roller bearings, etc., has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for one-story addition, about 145 x 300 ft. Cost over $250,000 with equipment. Irving S. Towsley, Otis Building, is consulting engineer.

Pittsburgh & Lake Erie Railroad Co., Lake Erie Terminal, Pittsburgh, has let general contract to Pittsburgh-Des Moines Steel Co. Neville Island, for one-story warehouse, 200 x 400 ft., on East Carson Street. Cost over $150,000 with loading, conveying and other mechanical-handling equipment.

Bethlehem Shipbuilding Co., Sparrows Point, Baltimore, has let general contract to McLean Contracting Co., Fidelity Building, Baltimore, for three additional shipways with one-story shops. Cost close to $2,000,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 27 for four medium-duty, gasoline engine-driven tractors (Schedule 23) for San Francisco yard; three generator test units for San Francisco and Seattle yards (Schedule 9975); until Jan. 29 for threading sets (Schedule 9980), die-stocks and tap wrenches (Schedule 9981) for Eastern and Western yards; 30,000 ft. of single-conductor electric cable (Schedule 3) for Mare Island and San Francisco yards.

The South

• **Public Works Officer,** Norfolk Navy Yard, Portsmouth, Va., plans one-story building for storage and distribution. Cost about $350,000 with equipment. Appropriation in that amount is being arranged.

Citrus Concentrates, Inc., Dunedin, Fla., B. C. Skinner, president, recently organized, has let general contract to Albert Haworth, 628 Raymond Avenue, for one-story plant, about 400 x 400 ft., on Dunedin Isle Road, for processing and production of orange concentrates. Cost close to $375,000 with machinery, instead of smaller sum previously noted.

Louisville Transmission Corp., recently organized subsidiary of Louisville Gas & Electric Co., 311 West Chestnut Street, Louisville, plans new steel tower, double-circuit transmission line from Paddy's Run steam-electric generating station of parent company, now in course of construction near Louisville, to point about 60 miles south of city, where terminal switching station will be built. Connection will be made at that point with similar high-tension line to be built by TVA, Knoxville, Tenn., from South Nashville, Tenn., about 105 miles, for power supply for latter organization. Entire project will cost about $7,700,000.

War Department, Washington, plans new plant for production of high explosives (TNT) near Point Pleasant, W. Va., comprising one-story buildings, with power house, machine shops, and other structures. Cost over $15,000,000 with equipment. It is understood that plant will be designed by E. B. Badger & Sons Co., 75 Pitts Street, Boston, engineer which will also supervise erection.

Pendleton Shipyard Co., Inc., New Orleans, Pendleton E. Lehde, Masonic Temple Building, engineer, president, recently organized, has let general contract to Gervais F. Favrot, Balter Building, for new shipbuilding plant



TOCCO BRAZES SHELLS 12 TIMES AS FAST!

● Armstrong Cork Company, Pittsburgh, Pa., is silver-soldering adapters to noses of 75 m. m. chemical shells at a rate of 25 seconds per shell per operator by TOCCO induction heating. Former methods would require at least 5 minutes per shell per operator . . . 12 times as long as induction heating!

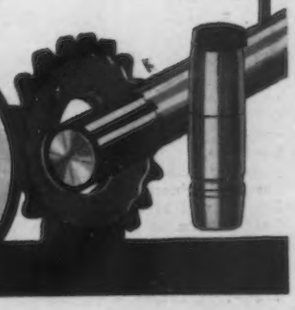
Other TOCCO advantages on this important Defense job: Cost is fraction of that of other methods. Localized heating permits safe handling of shells with bare hands; eliminates fire hazard. Uniform heating assures perfect bond; rejects are nil. No scaling. Operation is clean. Requires floor space only 4 ft. x 3 ft.

Why not investigate the SPEED, ECONOMY, QUALITY of TOCCO for *your* hardening or heating problems.

HOW TOCCO CAN HELP SOLVE YOUR PROBLEMS

1. Cuts heat-treating hours to seconds.
2. Simple push-button operation.
3. Eliminates 5 to 10 operations.
4. Hardens wearing surface only
5. —to any depth—any area
6. —every job uniform.
7. Retains ductility of core.
8. No distortion. No scaling.
9. Safe. Clean. Compact.
10. For hardening or heating wide variety of parts.

SPEEDY ELECTRIC HEAT IS GENERATED WITHIN THE PART OR SECTION TO BE HEAT-TREATED



THE OHIO CRANKSHAFT COMPANY
Cleveland • Ohio

TOCCO
World's Fastest, Most Accurate Heat Treating Process

on industrial canal for construction of vessels for Maritime Commission, Washington. It will consist of three shipways, four outfitting docks, plate shop, structural shop and mold loft, and auxiliary buildings. Cost about $550,000 with equipment. Barnard-Godat & Heft, Terminal Station Building, are consulting engineers. New company also has acquired plant of Union Iron Works, Inc., 427 Esplanade Avenue, and will operate in conjunction with shipyard; extensions and improvements are planned.

Madaras Steel Corp. of Texas, Inc., Longview, Tex., plans new iron ore reduction plant in vicinity of iron ore properties near Rusk, Tex., including electric furnaces and other facilities. Cost over $200,000 with equipment. Company recently arranged for increase in preferred stock to provide for expansion.

United States Engineer Office, Mobile, Ala., will close bids on or about Jan. 29 for one-story engineering shop at Air Corps base, Tyndall Field, Panama City, Fla.; also for a similar shop unit at Air Corps Base, Eglin Field, Valparaiso, Fla.

Gulf Shipbuilding Corp., Mobile, Ala., plans new outfitting dock at shipyard. Cost close to $200,000 with equipment. This is part of expansion program being carried out at plant.

Central States

• **Star Machine & Tool Co.,** 9320 Woodland Avenue, Cleveland, jigs, stamping dies, plans one-story addition. Cost close to $.5,000 with equipment. Edward G. Hoefler, 5005 Euclid Avenue, is consulting engineer.

War Department, Washington, has let contract to Ferro Concrete Construction Co., Third and Elm Streets, Cincinnati, for new plant at Kings Mills, near Lebanon, Ohio, for production of cartridges and ammunition, to be operated by Remington Arms Co., Bridgeport, Conn., under lease agreement, recently noted in these columns. It will include one and multi-story buildings, machine shops, power station and other structures. Cost $6,250,000 with equipment, fund to be furnished by Defense Plant Corp., Washington.

Firestone Tire & Rubber Co., Akron, Ohio, has let general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for one-story addition, 90 x 325 ft., for expansion in plant now given over to production of anti-aircraft guns, mounts and carriages for government. Cost over $500,000 with equipment. Company also plans another one-story addition, about 100,000 sq. ft. of floor space, for other type of armament. Cost over $750,000 with machinery.

B. & S. Screw Products Co., 1515 Coit Road, Cleveland, has let general contract to O. H. Hollister, 1337 East 152nd Street, for one-story addition, about 60 x 100 ft. Cost close to $50,000 with equipment. Theodore V. Nichols, 16828 Kinsman Road, is architect.

M. A. Hanna Co., Leader Building, Cleveland, ores, metals, coal, etc., plans new concentrating mill for treating of low-grade manganese ores in vicinity of manganese ore properties near Las Vegas, Nev. It will consist of several one and multi-story production and processing units, with machine shop, power house, pumping station and other structures. Entire output will be used by Metals Reserve Co., Washington, a federal agency. Cost about $4,500,000 with machinery, fund in that amount to be provided by Defense Plant Corp., Washington.

U. S. Steel Wire Spring Co., 7800 Finney Avenue, Cleveland, plans one-story addition. Cost close to $45,000 with equipment.

War Department, Washington, will begin work soon on new powder mill near Newport, Ind., where about 22,000 acres has been secured. It will comprise 100 or more one-story buildings, with power house, machine shops, pumping station and other structures. United States Engineer Office, Lieut.-Col. Harry R. Kadlec, will be in charge, and is establishing headquarters at Clinton, Ind. Plant will be operated by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and will cost about $53,500,000, fund to be supplied by Defense Plant Corp., Washington.

Davis-Westholt Aircraft Co., 335 South Water Street, Wichita, Kan., aircraft parts and equipment, has let general contract to Dodson Co., 1463 Barwise Street, for new one-story plant, about 50 x 125 ft., at 1521 McLean Boulevard. Cost close to $45,000 with equipment.

United States Engineer Office, Davidson Building, Kansas City, Mo., will be in charge of construction of new bomber air base for War Department near Pauline, Kan., to include hangars, service and repair shops, gasoline fueling system, pressure storage tanks, pumping station and other structures, in addition to barracks, utility buildings, etc. Cost about $10,000,000.

Ex-Cell-O Corp., 1200 Oakman Boulevard, Detroit, precision boring machines, thread grinders, pumps and other equipment, will begin superstructure soon for one-story addition, 130 x 297 ft., for which general contract recently was let to Austin Co., Cleveland. Cost over $200,000 with equipment.

Tecumseh Products Co., Tecumseh, Mich., compressors and parts, refrigerating condensing units, etc., has purchased former plant of Cyclone Fence Co., consisting of a one-story structure, about 60,000 sq. ft. of floor space, for production of ordnance for government.

International Industries, Inc., Fourth Street, Ann Arbor, Mich., optical equipment and other precision apparatus, will increase size of addition to be erected for production for government, with corresponding increase in expenditure from $75,000, as initially planned, to about $260,000. Structure will be one-story, 52 x 211 ft. Of amount noted, about $150,000 will be used for equipment and $110,000 for building. General contract has been let to Austin Co., Cleveland. Financing will be provided by Defense Plant Corp., Washington.

General Steel Castings Corp., Granite City, Ill., has let general contract to Frazier-Davis Construction Co., 1319 Macklind Street, St. Louis, for one-story addition. Cost over $200,000 with equipment. Giffels & Vallet, Marquette Building, Detroit, are architects and engineers. Main offices are at Eddystone, Philadelphia.

Ilg Electric Ventilating Co., 2850 North Pulaski Road, Chicago, fans, blowers, etc., has let general contract to Carl E. Erickson & Co., Inc., 1753 Broadway, for two-story addition, 40 x 120 ft. Cost over $50,000 with equipment. Alfred S. Alschuler and Ralph N. Friedman, Inc., 28 East Jackson Boulevard, is architect.

Wisconsin Axle Co., 567 High Street, Oshkosh, Wis., automobile axles, subsidiary of Timken-Detroit Axle Co., Detroit, has let general contract to Ben B. Ganther Co., 78 State Street, for one-story addition, 80 x 150 ft. Cost over $65,000 with equipment.

Remington Arms Co., Inc., Denver, plans additions to local ordnance plant, now in course of construction for government, consisting of a main two-story building, 50 x 200 ft., two smaller one-story structures, and two one-story wing extensions to existing buildings. Cost over $250,000 with equipment. Smith, Hunchman & Grylls, Marquette Building, Detroit, are architects and engineers.

Apex Smelting Co., 2537 West Taylor Street, Chicago, has let general contract to H. E. Johnson, 7723 South Michigan Avenue, for one-story addition, about 65 x 120 ft., for storage and distribution. Cost close to $40,000 with equipment. Sidney C. Finch, 134 North LaSalle Street, is architect.

Western States

• **American Shipbuilders Corp. of California, Inc.,** care of Dr. Howard Seager, Newport Beach, Cal., principal incorporator and head, has leased tract on Newport Bay for shipyard for construction of light-type vessels. Plant will include two or more shipways, outfitting dock, shops and other structures. Cost close to $175,000 with equipment.

Merco-Nordstrom Valve Co., 2431 Peralta Avenue, Oakland, Cal., valves, etc., has let general contract to Christensen & Lyons Co., 3454 Harlan Street, for two-story addition. Cost close to $100,000 with equipment.

Pacific Car & Foundry Co., 220 West Hudson Street, Seattle, plans one-story addition to plant at Renton, Wash., for production of steel castings for government. Cost about $700,000 with equipment, fund to be provided by Defense Plant Corp., Washington.

Lockheed Aircraft Corp., Burbank, Cal., has let general contract to H. W. Baum & Co., 232 South Van Ness Avenue, Los Angeles, for one-story hangar-type addition, 205 x 500 ft., for a final assembling unit. Cost over $450,000 with equipment. John and Donald B. Parkinson, Title Insurance Building, Los Angeles, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 27 for 30 straight sections gravity roller conveyors, each section 8 ft. long; 10 similar conveyors, each section 6 ft. long; two motor-driven scooters with express compartments; 48 steel platform trucks, platform 40 x 72 in., 2500 lb. capacity; 48 lifting platform trucks, hydraulic-type, heavy-duty, multiple stroke; 36 trailer trucks, with wooden deck, complete; and 48 two-wheel hand trucks (Schedule 21), 12 trucks, tilting, tiering, telescopic fork-type, with forward tilt unit, gasoline motor-driven, complete (Schedule 22), for San Francisco yard; until Jan. 29 for 13,248 igniter, oxy-acetylene torches (Schedule 9982) for Oakland, Cal., yard.

United States Engineer Office, Pittock Block, Portland, Ore., asks bids until Jan. 30 for 12 regulating gates, 12 regulating gate supports with chain lock, and 120 segmental gates (Circular 411).

Canada

• **Port Arthur Shipbuilding Co., Ltd.,** Port Arthur, Ont., has approved plans for one-story addition, for a hot-dip galvanizing plant. Cost about $165,000 with electric furnace and other equipment. C. D. Howe Co., Ltd., Public Utilities Building, is consulting engineer.

Hollinger Consolidated Gold Mines, Ltd., Royal Bank Building, Toronto, Ont., plans one-story mill at Timmins, Ont., mining properties, for recovery of tungsten. Cost about $55,000 with equipment.

Belleville Foundry Co., Ltd., Belleville, Ont., plans one-story addition. Cost close to $50,000 with equipment.

Wilson Motor Bodies, Ltd., 48 Abell Street, Toronto, is considering plans for erection of a new plant on Lake Shore Road, New Toronto, to cost about $80,000 with equipment.

Algoma Steel Corp., Ltd., 503 Queen Street, Sault Ste. Marie, Ont., has awarded general contract at Aiken & MacLachlan, Ltd., 9 Queen Street, St. Catharines, Ont., for construction of limestone dock to cost $200,000. This is part of the $4,000,000 expansion program financed by Canadian Government.

Otis-Fensom Elevator Co., Ltd., Victoria Avenue North, Hamilton, Ont., has started work on construction of heat treatment plant, gun barrel plant and two storage buildings, for which general contract has been awarded to W. H. Yates Construction Co., Ltd., 400 Wellington Street North. Cost about $1,000,000 with equipment.

Hull Iron & Steel Foundries, Ltd., Hull, Que., will start work soon on foundry additions, construction to cost about $350,000 and equipment $600,000. General contract awarded to R. Brunet & Fils, 35 Aylmer Road, Hull.

Webber Machine Co., 15 Alcorn Avenue, Toronto, has purchased site at 1212 Yonge Street, for erection of new machine shop, to cost, with equipment, about $50,000.